The Builder.

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ILLUSTRATIONS.

Hull Town Hall and Law Courts .....Messrs. S. B. Russell and T. Edwin Cooper, FF.R.I.B.A., Architect
St. Andrew and St. Patrick's Church, Elveden .....Mr. W. D. Caröe, F.R.I.B.A., Architect.
New Central Reference Library, Bristol .....Mr. H. Percy Adams, F.R.I.B.A., Architect.
East Window of Chulmleigh Church, Devon.....Designed and Executed by Miss Caroline C. Townshend.

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The Port of Antwerp.

SINCE the commencement of last century, when Napoleon laid the foundation-stone of the greatness to which Antwerp has risen in modern times, the commerce of the port has steadily increased year by year. The works authorised by Napoleon in 1803 included the construction of docks which cost the large sum of 2,000,000*l*., and served the needs of the city for many years. Two of his docks, the Petit Bassin, or Bassin Napoleon, and the Grand Bassin, or Bassin Guillaume, are still in existence, and among others added by the city authorities are the Bassin du Kattendyk, the Bassin aux Bois, the Bassin Asia, the Bassin de la Campine, and the Bassin du Canal. The most important of these is the Bassin du Kattendyk, built in 1856. About the year 1880 the system comprised eight docks, all in communication, and quays with an aggregate length of 21,000 ft.

Owing to the further increase of commerce, the dock system soon required further enlargement. Hence, in 1887-8, the Bassins Lefebvre and America were constructed, with a water surface of 54 acres, and in 1881 the Bassin du Kattendyk was lengthened, additional dry docks being built at the same time.

Extensions of the quays along the river were subsequently made, until, including a length of about 2,200 yds., opened in 1903, they now stretch the eastern bank of the river Scheldt for a distance of nearly 2½ miles, and behind them is the connected system of basins, shown in Fig. 1.

Along the quay walls large warehouses have been built, on the top of which is a fine public promenade. In front of and behind the sheds are double railway lines, and on the quays there are about a hundred hydraulic cranes, of capacities varying between 1½ and 2 tons each, as well as numerous hydraulic capstans and other mechanical appliances for dealing with merchandise.

Near the middle of the river quay is the Steen, the only remaining part of the ancient citadel, and opposite this building is a pontoon 328 ft. long by 65 ft. wide, with jetties on either side. Near the Gare du Sud there are three docks devoted to the petroleum trade behind the landing stage used by the Great Eastern Railway steamers. To the foregoing notes we may add that a general system of hydraulic power transmission has been established for operating hoisting and other machinery at all the docks, the central station including boilers and steam engines with an aggregate capacity of 600 horse-power.

At the end of the Grand Bassin are the new bonded warehouses, built to replace those destroyed by the great fire of 1901, the effects of which were discussed in our issue of June 22, 1901, where also will be found a plan of the old warehouses.

After the disastrous experience of that year the authorities very properly determined upon the adoption of fire-resisting construction, and the warehouses were rebuilt in concrete-steel on the Hennebique system. Moreover, the four blocks of the new buildings were completely separated by courtyards of ample size.

In 1880 the vessels entering the Port of Antwerp represented a total of 3,063,825 tons, and nine years later the total had increased to 6,872,848 tons, an increase of nearly 125 per cent. Consequently it is not surprising that those interested in the shipping industry commenced an agitation for further extension of the port.

The municipalities could not move alone in the desired direction, because the northern line of fortifications, erected in 1860, when the ancient ramparts were pulled down, could not be modified without the consent and co-operation of the Government. By Fig. 1 it will be seen that the fortifications are just outside the existing dock system, and bar the way to any extensions. To build a new line of fortifications would necessarily involve a very large outlay, and in addition to this difficulty some differences of opinion existed between the Government and the city authorities on the subject of the most suitable programme of dock extension.

Although matters remained under discussion for several years, they were not allowed to remain entirely at a standstill.

The new quays, already mentioned were added in 1903, and the line of fortifications opposite the Bassin Lefebvre has been broken, so as to permit the construction of a new dock—the Bassin Intercalaire—a channel connecting it with the Bassin Lefebvre and a new

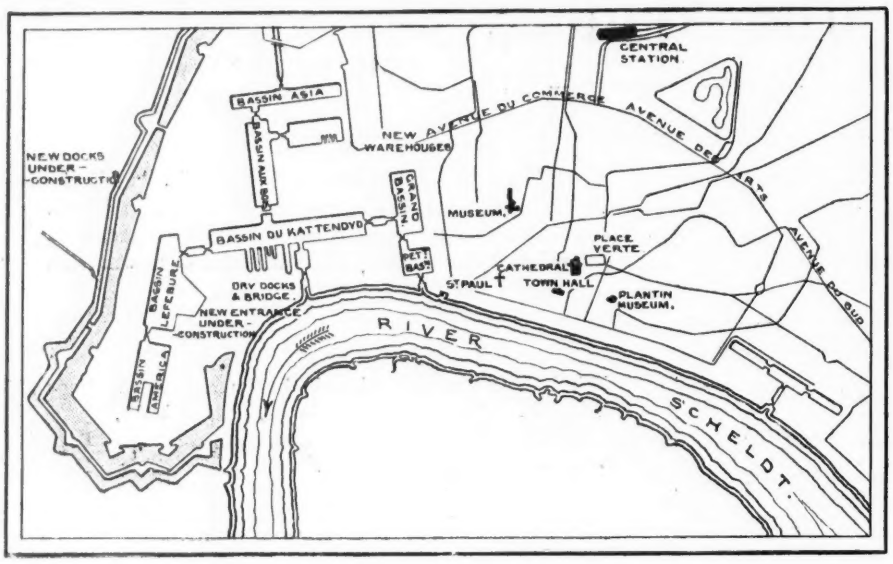


Fig. 1. Plan of Antwerp Docks.

entrance channel from the river to the Bassin Lefebvre. These works are now under construction at an estimated cost of 300,000*l.*, the total area covered being 330,000 square yards.

As announced in our issue of May 6 last, all points of difference between the Government and the city authorities have been adjusted, and the joint scheme for the construction of new docks and fortifications forms the subject of a Government Bill now before the Belgian Chambers for final approval.

In Fig. 2 we show the main features of the port extension scheme, which involves a total expenditure of between five and six million pounds. One of the most important features of the project is the diversion of the Scheldt from its existing bed into a new channel more than five miles in length. The main reason for this work is to be found in the fact that the great bend of the river between Antwerp and a point some 6½ miles on the downstream side contains three particularly sharp angles, and causes some inconvenience and risk to navigators by encouraging the movement of shifting sandbanks.

This bend will be disconnected by means of dams at the two points indicated in Fig. 2, and the new course of the river will follow an almost direct line between Antwerp and the other arm of the bend. A canal, furnished at each end with locks, will provide means of communication with the enclosed area.

This diversion was suggested some years ago by the Government, but the city authorities then feared that its effect might be detrimental to the interests of the port, partly in consequence of interference with traffic during the execution of the scheme, and partly because it was feared that the depth of water in the river might be permanently reduced. The latter objection seems quite untenable, but the former was not without justification. The new project entirely disposes of any risk of the kind, as will be understood by the following particulars.

Before the commencement of the diversion works the Dock Canal, shown in Fig. 2, is to be made, parallel with the proposed river bed, and connected with the present river bed by an entrance channel and three parallel locks, each measuring 984 ft. long by 98 ft. wide and having a depth of 26 ft. at low tide. From the lock entrance to the Bassin Intercalaire the canal will be about 4 miles long, its average width 815 ft., and its depth 39 ft. at high tide.

By the construction of the new Dock Canal vessels will be able to proceed through the Bassin Intercalaire to the existing system of docks quite independently of that part of the river above the commencement of the new channel. Therefore, even if any temporary obstruction should become necessary during the execution of the diversion works, no serious interference with traffic need be anticipated.

Transit sheds and berths will be provided near the entrance to the Dock Canal, on one side of which nine large docks are to be constructed, as well as a circular basin surrounded by shipbuilding yards and a series of five dry docks, the largest dry dock with a length of 820 ft. Seven of the nine docks will be 3,940 ft. long, and the remaining two about 3,150 ft. and 2,110 ft. long respectively. All these docks will be 656 ft. wide, and 39 ft. deep at high tide.

A branch railway line will connect the new shipping berths below the triple locks with the system of the Belgian State railways, thus affording direct communication with Holland, Brussels, and all parts of Belgium. The quays between the nine new docks and around the Bassin Intercalaire will be furnished with sidings, also in communication with the State railways.

The land between the Dock Canal and the new channel of the Scheldt represents an area of 272 acres, which will afford an excellent site for quays and warehouses.

After the completion of the Dock Canal the diversion of the Scheldt will be taken in hand. As shown in Fig. 2, the new channel will pass through and abolish the present Bassin America (see also Fig. 1).

As soon as this part of the work has been executed the present bed of the river will be shut off by the two barrages, and the new channel will be opened for traffic. The enclosed portion of the river will be available for use by vessels awaiting instructions or cargo, and it is not improbable that developments may take place that will render the quays

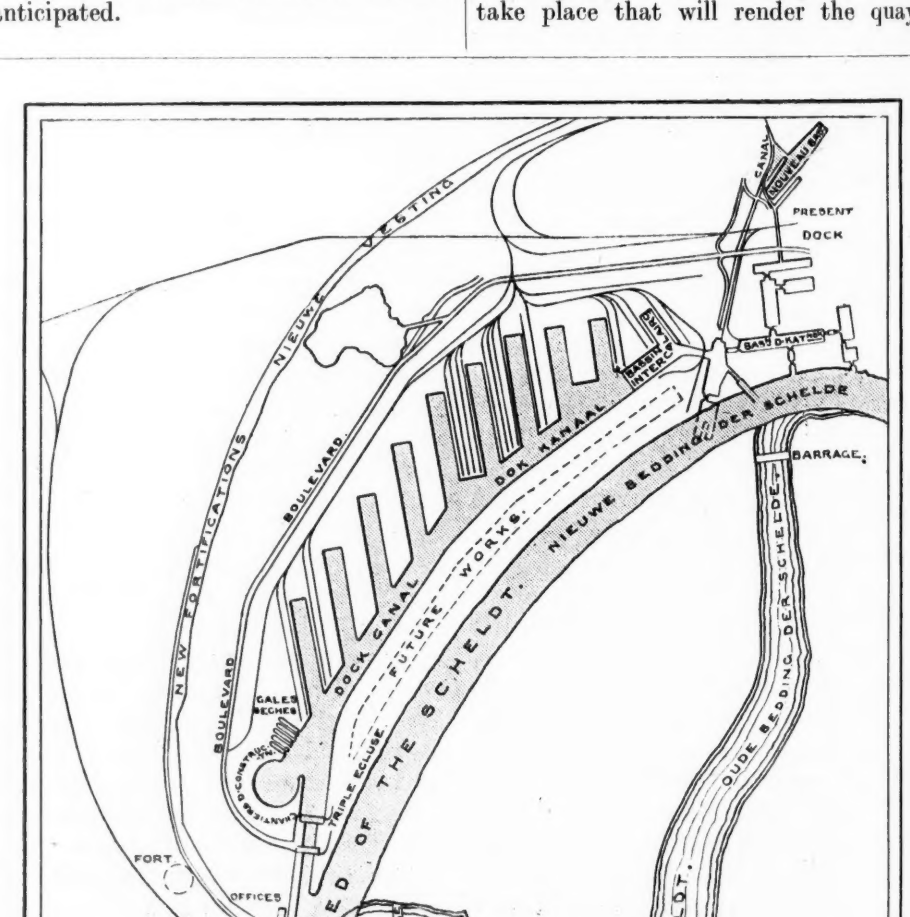


Fig. 2. Plan of Antwerp New Docks.

bordering this water area of considerable importance.

The island between the old and the new channels is at present occupied by several villages, which will be abolished so that the area may be devoted to industries associated with the shipping trade.

The material excavated during the construction of the works will be utilised in raising the level of the low-lying lands about the new docks, thus making them more suitable for building purposes.

Between the new fortifications and the docks a boulevard will be laid out, and the intervening strip of land will form the site for a large extension of the city.

When the entire scheme has been realised, the total length of quays of all kinds in the port will be fully 30 miles. The execution of the works is estimated to occupy about ten years, and Belgians are now anticipating that their completion will have the effect of raising Antwerp to the first place among the great seaports of the world. Whether this result will be achieved or not very much depends upon those who have it in their power to undertake the long-desired organisation and improvement of the Port of London.

THE CHEMICAL ANALYSIS OF LIMES AND CEMENTS.

By M. J. MALETTE, Professor at L'Ecole Speciale de Travaux Publics, Paris.

THE rapid progress made during recent years in the manufacture of limes and cements has induced different countries to establish regulations for governing the acceptance of these hydraulic products.

If authorities find it desirable to draw specifications calculated to eliminate defective materials from public works, conscientious manufacturers equally derive advantage from the exclusion of badly-made products.

It is to be desired that, with the same object, an international agreement could be arrived at with the object of standardising all methods of testing such materials of construction. Physical and mechanical tests sometimes present divergencies little noticed but nevertheless undesirable.

Still, as existing methods have been settled by the co-operation of experts in each country, and, further, as these divergencies frequently relate to mere points of detail, it may fairly be said that a great step has already been made towards future standardisation. As for chemical tests, the methods adopted are practically identical. This follows naturally, since they are based upon recognised analytical procedure. Nevertheless, an undeniable advantage would be attained by precise definition of the conditions to be observed in connexion with such tests. Some chemists are so particular as to repeat a precipitation for the determination of an element, when a single precipitation is sufficient for a satisfactory approximation in simple cases. This excess of care involves an expenditure of time which is not always proportionate with the result obtained.

So far as limes and cements are concerned the following *modus operandi* may be considered as giving a very satisfactory guarantee of exactitude.

Silica.—Upon one or two grammes of the material, finely pulverised and then placed in a porcelain capsule, drop a small quantity of hydrochloric acid diluted with an equal volume of distilled water, thereby causing a brisk effervescence. Then dessicate the contents of the capsule by evaporation. Treat the residue with a little hydrochloric acid, and then with a little water. A second evaporation is next to be conducted as before. Finally, the undissolved residue is to be treated with a little hydrochloric acid and water. It consists of silica, and sometimes includes grains of sand. Filtration permits the separation of the solid particles, which can be dried, calcined, and weighed.

Alumina and Ferric Oxide.—To the filtered liquid furnished by the operation described above some drops of nitric acid are added, after which it is boiled. In this manner one makes sure that all the ferrous oxide has passed to the state of ferric oxide. Liquid ammonia is added, with the result that alumina and ferric oxide are precipitated. After cooling the liquid the precipitate is collected by filtration, dessicated, calcined, and weighed.

Lime.—To the filtered liquid obtained as above a sufficient quantity of solution of ammonium oxalate is added. Lime is precipitated in the form of calcium oxalate. After dessication the precipitate is calcined by means of a blow-pipe, the product being caustic lime (CaO).

The precipitate can also be calcined at lower temperature over the flame of a spirit lamp. The product then obtained is calcium carbonate. The latter mode of operation is sometimes preferable to the former.

Magnesia.—To the filtered liquid obtained as above add a little solution of sodium phosphate. This precipitates ammonium-magnesic phosphate, which, after separation and calcination, gives magnesium pyrophosphate, from which the quantity of magnesia may be deduced.

Loss by Fire.—The loss by fire is ascertained by subjecting some grammes of pulverised material to a bright red heat for a period of about six minutes. The difference of the initial and final weights gives the loss by fire, which includes, apart from water and carbon dioxide, all other volatile substances present in the product treated.

Sulphuric Anhydride.—This determination is made upon a separate sample of the product to be examined. Two or five grammes of the material for analysis are placed in digestion with a solution of ammonium carbonate. A double reaction takes place, resulting in the formation of insoluble calcium carbonate and soluble ammonium sulphate. The ammonium sulphate is separated by filtration, and treated by barium chloride. Thus is obtained insoluble barium sulphate, which is weighed after calcination.

Another method of operation is as follows: After separation of the silica, in the manner already indicated, barium chloride is added to the filtered liquid. This gives a precipitate of barium sulphate, which is calcined and weighed.

Alkalis.—The determination of fixed alkalis (potash and soda) is made upon a separate sample of the material. As alkaline salts must not be introduced during the course of the analysis, it is necessary to avoid the employment of sodium phosphate for the precipitation of magnesia.

This determination is made in a special manner, but it presents no particular difficulty.

Separation of Alumina and Ferric Oxide.—The total precipitate of alumina and ferric oxide, obtained by the operation described above, is re-dissolved in hydrochloric acid. To the solution is added a quantity of tartaric acid, or citric acid, sufficient to prevent precipitation by the ammonia solution subsequently added. Ammonium sulphide is dissolved in liquid ammonia, and the addition of this to the dissolved precipitate causes the deposition of ferrous sulphide, which is collected and calcined, the residue being ferric oxide. The quantity of this is determined directly by weighing, and the quantity of alumina by taking into account the difference of weight.

Separation of Water and Carbon Dioxide.—This operation can be effected in various ways. The apparatus of Berzélius and Rose is frequently employed for the determination of carbon dioxide. The quantity of water can be ascertained either directly or by calculating from differences.

Sand.—If the product contains sand in appreciable quantity, as evidenced after treatment by hydrochloric acid, it is necessary to make determination of it, for this inert substance should be considered as silica—that is to say, as an active element.

For determination the process of levigation is adopted. This consists in treating two, five, or ten grammes of the product, according to the presumed proportion of sand, by the application of hydrochloric acid. Energetic agitation of the liquid, followed by rapid decantation, removes the greater part of the silica and clay in suspension. The operation must be repeated as often as necessary, with the addition of water after each decantation. Finally, when nothing but sand remains, this is collected, dessicated, and weighed.

Manganese.—If the hydraulic material contains manganese, it is necessary to take account of the quantity.

The determination can be effected by applying nitric acid to the residue remaining after evaporation to dryness, separating from it insoluble substances, and adding minium (red lead) to the solution, the temperature of which should be raised to 90 deg. C. A red colouration thereby results, the intensity of which is proportional to the quantity of manganese present.

Comparison made by means of a colorimeter between this coloured liquid and a standard solution of potassium permanganate, containing a known proportion of manganese, permits the determination of the quantity of manganese in the sample taken.

An analysis, conducted in the manner described above, suffices for all practical purposes, and enables useful conclusions to be drawn as to the nature of the

hydraulic cementing material under examination.

The well-known engineer of the Ponts et Chaussées, Monsieur Vicat, who by his numerous works has contributed so much to the development of the rational manufacture of limes and cements, has adopted for such products the following classification, based upon the value of the index of hydraulicity and upon the time of setting:—

CLASSIFICATION OF HYDRAULIC LIMES AND CEMENTS (*Vicat*).

Nature of Material.	Index of Hydraulicity.	Percentage of Clay before Roasting.	Duration of Setting.
Lime, fat or lean	0 – 0·10	0 – 5·3	over 30 days
„ slightly hydraulic	0·10–0·16	5·3– 8·2	16–30 „
„ moderately hydraulic	0·16–0·31	8·2–14·8	10–15 „
„ hydraulic	0·31–0·42	14·8–19·1	5– 9 „
„ extremely hydraulic	0·42–0·50	19·1–21·8	2– 4 „
„ limit or Portland cement	0·50–0·65	21·8–26·7	10–18 hours
Cement, rapid setting	0·65–1·20	26·7–40·0	2–10 „
„ poor	1·20–3·00	40·0–62·6	—
„ pozzuolanic	above 3·00	above 62·6	—

This classification furnishes a practical means of ascertaining the class to which any given hydraulic product belongs. It is necessary, however, to bear in mind the fact that the index of hydraulicity constitutes rather a presumption than a certitude of the more or less hydraulic value of a product. This qualification is not always remembered, and consequently products are sometimes passed as very hydraulic agglomerants, but which do not strictly belong to the category in which they have been placed.

The index of hydraulicity (I), to which we now direct attention, is, according to Vicat, the quotient of the sum of the weights of silica and alumina by the weight of lime existing in 100 grammes of the product—that is to say, it may be represented by the formula:—

$$I = \frac{P_{SiO_2} + P'_{Al_2O_3}}{P''_{CaO}}$$

During recent years it has been thought desirable to take into account magnesia, which also is a substance having an influence on hydraulicity.

Thus the modified index takes the following form:—

$$I' = \frac{P_{SiO_2} + P'_{Al_2O_3}}{P''_{CaO} + P'''_{MgO}}$$

Some chemists consider that ferric oxide conduces to hydraulicity. Accepting this view, we have two formulæ, either of which can be used according as magnesia is or is not introduced as a factor. Thus:—

$$I'' = \frac{P_{SiO_2} + P'_{Al_2O_3} + p_{Fe_2O_3}}{P''_{CaO}}$$

$$I''' = \frac{P_{SiO_2} + P'_{Al_2O_3} + p_{Fe_2O_3}}{P''_{CaO} + P'''_{MgO}}$$

It should be added that opinion with regard to this theory is by no means unanimous, and that, on the contrary, the more general view is that ferrous oxide contributes in some measure to the solidification of the product, and that the *rôle* of ferric oxide is nothing in the hardening of Portland cement.

We shall see presently the inconvenience that may result from these diverse interpretations.

Let us take, for example, a brand of product well-known for the constancy of its composition and for its good cementive qualities. The product in question has given the following results:—

Sand	2·10
Combined Silica	24·25
Alumina	7·35
Ferric Oxide	3·50
Lime	52·80
Magnesia	1·90
Sulphuric Anhydride	1·30
Loss by fire	6·80
Total	100·00

If the essential factors be extracted we have:—

SiO_2	P	=	24·25
Al_2O_3	P′	=	7·35
Fe_2O_3	p	=	3·50
CaO	P″	=	52·80
MgO	P‴	=	1·90

The indices of hydraulicity calculated according to the preceding formulæ, will be:—

$$I = \frac{24{\cdot}25 + 7{\cdot}35}{52{\cdot}80} = 0{\cdot}598$$

$$I' = \frac{24{\cdot}25 + 7{\cdot}35}{52{\cdot}80 + 1{\cdot}90} = 0{\cdot}578$$

$$I'' = \frac{24{\cdot}25 + 7{\cdot}35 + 3{\cdot}50}{52{\cdot}80} = 0{\cdot}665$$

$$I''' = \frac{24{\cdot}25 + 7{\cdot}35 + 3{\cdot}50}{52{\cdot}80 + 1{\cdot}90} = 0{\cdot}642$$

Referring to the table of Vicat, we find that these indices correspond to:—

(I) Slow-setting cement.
(I′) „ „
(I″) Quick-setting cement.
(I‴) „ „

By this comparison we see at once that, according to the adoption of one or the other formula, the cement may be regarded as slow-setting or as quick-setting.

The maximum divergency in the example chosen is given by the indices I′ and I″, which show a difference of 8 to 9 units in the second place of decimals (0·665 — 0·578 = 0·087), while a single unit in the same position suffices to change the category of the product.

The divergencies between the three last formulæ and the formula of Vicat increase in magnitude with the percentages of ferric oxide and of magnesia in the product considered.

It seems to be useful to point out these divergencies with the view of obviating all false interpretations when the index of hydraulicity is employed exclusively for estimating the character of a hydraulic cementing material.

RE-BUILDING IN OXFORD-STREET, W.—Many more houses have recently been pulled down, and their sites have been taken for new buildings designed after a more elaborated and decorative manner. The latest changes have involved the demolition of Nos. 164-180, for the new premises for Waring & Gillow, Ltd., of which Mr. R. F. Atkinson was appointed architect; and the demolition of Nos. 376-384, together with the adjoining three houses in Bird-street and four in James-street, for premises, nearly completed, erected after plans and designs by Messrs. A. E. Hughes & Son. The new buildings, Nos. 352-4, at the corner of Marylebone-lane, west, are by Mr. George Hornblower.

NOTES.

Closed Churches. A FEW weeks ago we drew attention in a Note to the number of closed churches all over England. During the last week or two a correspondence on this subject—so interesting to archæologists and students of architecture—has continued in the *Times*. It originally arose by complaints of the churches in Kent and Suffolk being kept closed, but the complaint is now made more general—that a number of interesting churches all over the country are not open on weekdays. The clergy have allowed judgment practically to go by default. One incumbent writes that the church plate was stolen sixty-five years ago—probably at night—which is an odd excuse for locking up his church in the daytime now. One might also ask, was the plate kept, as it should have been, in a safe? Another says that if the complaining visitor had called at the vicarage he would have been shown over the church. But, speaking generally, no reply has been made to the point that, as a number of churches are kept open daily without harm, it may be presumed that, except in some exceptional districts, or on exceptional days, those churches that are now closed might properly be kept open.

Bow Bells. THE popular "quarter-chime" tune "Turn again, Dick Whittington, Lord Mayor of London," will henceforth be played by the famous bells, for which its setting has been harmonised by Sir Charles V. Stanford. New automatical apparatus connected with the clock is in course of being fitted for the chimes by Messrs. Thwaites & Reed, of Clerkenwell. Mr. Hughes, of Messrs. Mears & Stainbank, of Whitechapel, has re-hung the twelve bells, of which the tenor, weighing 53 cwt., was cast by that firm's predecessors, Lester & Pack, in 1669, when it is believed was used some metal of the old bells destroyed by the Great Fire, and recast by them in 1738. Nine more bells having been added, by subscription, the ten were rung for the first time on June 4, 1762, in honour of King George III.'s visit on his birthday to the City; two more bells were added twenty-five years ago, though some fears had existed that swinging the bells might weaken the stability of the steeple.

The Distribution of Electric Energy. IN an article which recently appeared in *La Houille Blanche*, one of the best known of the French technical journals, there is an account of the "Distribution of Electric Energy in the Department of Aude," which is of special interest in connexion with the many power schemes which are so prominently before the public in this country at present. The power is obtained from the waterfall of the Aude, which is more than 300 ft. high. Turbine alternators are used, and the power is transmitted by three phase overhead wires. The greatest distance of the high pressure network from the power station is 85 miles, but the network extends over 375 miles. The principal distributing station is at Fabrezan, which is connected directly with the power station by overhead wires 45 miles

long. Owing to the high price of copper, comparatively light conductors are used, and so no less than 20 per cent. of the total power generated is expended in the useless heating of these conductors. Many eagles and other birds of prey have been killed by shock. The momentary short circuits caused by such accidents, and also by mountain rats gnawing at the insulation of transformer windings were some of the difficulties that had to be overcome. In France it is customary for the various communes through whose districts a private company wishes to lead its supply mains to make satisfactory arrangements with the company. In Aude all the municipal lighting is done gratuitously. Twenty-five 16-candle-power lamps are maintained for each thousand inhabitants. On the other hand, the only capital expense the company had was in building the power house, providing the necessary machinery, and constructing the high-tension feeder mains to Fabrezan. The initial cost of the rest of the network, of the distributing stations, and of the transforming and distributing apparatus was defrayed by the various communes. Small kiosques built of stone are used in many places for transformers to convert the energy to lower pressures suitable for transmitting to private consumers. Meters are rarely used; a uniform charge of 32 francs per annum for each 16-candle-power lamp connected being made. The charge for power is much smaller, but is made on a similar basis. Practically every commune has replaced the petrol motors used for pumping water by electric motors, and the use of electric power is rapidly extending. Financially the undertaking has proved successful. It is instructive to notice that the company and the municipalities work harmoniously and to their mutual advantage.

Motor Traffic.

TWO circulars have just appeared in the public Press—one issued by a new Society, the National Automobile Society, and the other by the Highways Protection League. In view of the fact that the position of motor cars will shortly be the subject of an inquiry before a Royal Commission, it is instructive to read the views of these two Societies as contained in their circulars. The former Society advocates moderation, and, whilst it recognises the fact that the use of the roads has been abused, it attributes this to a limited class of motorists. It advocates the abolition of a speed limit, and upon this suggestion there is much to be said, as there has been a tendency to regard the present limit as a minimum. The use of high-speed cars on roads it deprecates, and it seeks to secure methods of reducing dust production. The tone is essentially moderate, but a discordant note is struck when it suggests a canvass of candidates at the next General Election, as this question should not be made a political one. The Highways Protection League, on the other hand, advocates a speed limit, the maximum being fourteen miles an hour, and it also puts forward some practical suggestions as, for instance, that the owner of a car when present shall be made liable, and that a maximum candle-power for head-lights shall be prescribed. Other suggestions are put forward, which, though desirable from the point of view of the non-motorist, are perhaps too drastic. At the present time we fear it must be admitted that the inconsiderate motorist is more in evidence than the motorist who usually appears in print—he is too apt to forget that his car can be slowed when approaching other vehicles, and, relying on his own skill, is too apt to cut in between them, overlooking the fact that horses are not mechanical contrivancies. He is also forgetful of the dust he raises when passing ladies. We think a mechanical difficulty in connexion with very high-speed cars may often be the cause of excessive speed, as such cars, when running at low speeds, are apt to vibrate unpleasantly. It must be admitted, of course, that a car must have capacity for higher speed than that required on the level, as otherwise hill climbing is an impossibility; but too much attention has been given by those interested in motors to developing their racing capacities. Manufacturers would do well to turn their attention to the manufacture of cars the best adapted to use on the roads, and if motorists will then drive as moderately as they write, we think there is every hope that the motor question will soon pass out of its acute stage.

Mechanical Stoking for Locomotives.

CONSIDERING the arduous labour imposed upon the fireman of a modern railway engine, it is a little to be wondered at that locomotive engineers have not yet taken to the use of mechanical stokers. The large grate area of a heavy locomotive makes it a difficult as well as a laborious task for the fireman to distribute the coal in an efficient manner over the whole surface, an operation that could be far better performed by mechanical means. We believe that one of two preliminary trials of such apparatus have been made on American railways, and, in our opinion, the time has now come for thorough investigation of the subject. The mechanical stoker has been applied with marked success to stationary boilers of all kinds, and it is tolerably certain that, with necessary modifications, it would be equally useful in connexion with locomotive boilers. One great advantage to be secured by its adoption would be to leave the fireman more time for the discharge of his other duties, the most important of these being to render assistance to the driver in looking out for signals.

The Ox Bow Tunnel.

AN interesting engineering work of which very little has been heard is the tunnel between the two ends of a loop on the Payette River in Idaho, U.S.A., this loop being known as the Ox Bow. The tunnel has a cross section of 28 ft. wide by 9 ft. high, and is about 1,200 ft. long. Under ordinary conditions the driving of such a tunnel would present no difficulties, but, as occurred during the construction of the Simplon tunnel, hot water was encountered in considerable quantities at distances of 300 ft. and 250 ft. respectively from the ends. The temperature, commencing at about 95 deg. F., increased as the work went on to 132 deg. F., causing much inconvenience to the men employed. After fans of various kinds had been tried unsuccessfully for the purpose of cooling the air, the resident engineer proposed the simple device of spraying the walls of the tunnel with cold water. Pumps and hose fitted with ordinary roses were then provided and used with entirely satisfactory results. The temperature of the air was reduced to reasonable limits, and the hot water was so much cooled that after being collected in sumps it could be pumped out by the ordinary plant.

Brick-faced Dams.

THE Cray dam in connexion with the Swansea waterworks is a masonry structure which was originally to have been faced with stone, but it was found that the cost of dressing the available stone would be so considerable that the Borough Engineer proposed brick as an alternative. Before adopting this material he inspected the brick-faced dam at Remscheid, in Prussia, and the similarly treated work at Rhayader, in Radnor. Investigation was also made into the properties of brick with regard to watertightness, durability, and resistance to climatic influences. Finally, the facing was formed with two layers of brickwork laid in 1·3 cement mortar, the inner of brindled brick and the outer of pressed blue facing brick, the average thickness of the facing being 1 ft. 6 in. We have no doubt this type of construction will prove satisfactory, but it is not clear why concrete was not adopted. This is a material which has been largely used for similar works, and if mixed in suitable proportions it is quite as satisfactory, and at the same time less costly, than brick masonry.

British and Foreign Granite.

IT seems an extraordinary thing that Norwegian granite is being extensively used in the construction of the new docks at Devonport, a place which is close to unlimited sources of supply. The explanation of the contractors is that the stone can be procured at a lower price from Norway, and the suggestion is also made that the organisation of the quarry industry in the same country makes the supply more reliable than that furnished from the granite quarries of Devonshire and Cornwall. Although shipping rates are always low as compared with railway charges, we cannot think that they place Norwegian quarry owners in a more favourable position than their competitors, so far as Devonport is concerned, and it may be open to question whether there is much in the suggested superiority of organisation. The probability is that the contractors have been able to obtain specially low prices by tempting Norwegian quarries with a large order. So far as Government contracts are concerned it certainly ought to be a rule that British materials should be employed whenever practicable, and considerable sympathy will be felt with the resolution passed by the Penryn Corporation requesting the Government to insist on the use of British granite only in all Government works.

National Co-Partnership Exhibition at the Crystal Palace.

THIS exhibition, opened last week by Mr. William Crooks, M.P., has for its object the furthering of co-operation among the working classes in the various trades in order to give people more

interest in their work and take away the idea that they are merely "profit-making machines." The co-operative housing societies, most of whom exhibited photographs and prospectuses, have done much good work in this direction. The system on which these companies work is to erect houses, let them at ordinary rents, paying a moderate interest on capital from 4 to 5 per cent., and dividing the surplus profits among the tenant members, who can thus in time acquire through investment or by accumulated capital the value of the property. The Ealing Tenants, Ltd., one of the most flourishing of these societies, owns property worth more than 32,000*l*. The Garden City Tenants, Ltd., the latest addition to these, formed this year at Letchworth, has already built a pair of cottages at the Garden City, which are shortly to be followed by a number of others, arranged round a village green. They appear to be excellent examples of this class of cheap cottage, with plenty of accommodation inside, and the exterior pleasant and attractive. Other exhibitors were the Co-operative Builders, Ltd., Kettering; the General Builders, Ltd., who were the contractors for the Garden City press factory; and The Haslemere Builders, Ltd., who showed specimens of sand-faced tiles and stock and facing bricks of good texture and colour, also joinery. The North Wales Quarries, Ltd., had specimens of their slates, and the Mosaic Workers' Co-operative Society had on view several designs in wall and pavement mosaic.

LETTER FROM PARIS.

REFERENCE has already been made to a proposed exhibition, at the Château de Bagatelle (formerly the property of Sir Richard Wallace), of an important loan collection of English paintings of the XVIIIth and XIXth centuries. This was very successfully started and was attracting a great deal of public attention, when it was all put an end to in consequence of the susceptibilities of the Paris Municipal Council. It appears that the proposal was made at the time when the Municipal Council was not in session, and the Prefect of the Seine took upon himself to authorise the use of the château for this purpose. In regard to this infringement on its authority the Council has openly shown its offence, and in consequence the owners have all withdrawn their pictures. One of them, M. Camille Groult, has offered to the Louvre three fine Turners (one of them being a view of the Pont Neuf), which would otherwise no doubt have been presented to the municipal collection, so that the Council have been the losers by their ill-timed demonstration of feeling, besides probably discouraging the owners of pictures from lending them in future.

At the Petit Palais the new gallery devoted to the exhibition of the products of the Sèvres manufactory is shortly to be opened, and also those in which are to be exhibited the collected works of Dalou in sculpture and of Ziem in painting. There is talk also of exhibiting the collected works of Paul Dubois and of Henner. A competition is to be opened, by the Municipality and the State in conjunction, for the design for the proposed monument to the great French landscape-painters of the past generation, which, as already mentioned, it is proposed to erect on the Cours la Reine, not far from the Petit Palais. The monument to the Paris aëronauts, the last work of Bartholdi, which has been completed since his death, is to be erected, towards the end of this year, at the Porte des Ternes at Neuilly.

A critical estimate of Bouguereau as a painter has already appeared under the head of "Notes" last week; but a few facts in regard to the painter and his works may be added here. Bouguereau was born on November 30, 1825, at La Rochelle, where also he died. He commenced his studies at Bordeaux, and went subsequently to the Ecole des Beaux-Arts, where he was the pupil of Picot. Since the time when, in 1850, along with Baudry, he obtained the Prix de Rome, he never ceased working, so that his artistic career extends over more than half a century, for he was still exhibiting at this year's Salon. One of his works sent from the Villa Medici, "The Burial of St. Cecilia in the Catacombs," gained him already a medal of the Second Class; the picture is now in the Luxembourg. Among the succession of works which he exhibited subsequently, may be mentioned "L'Amour Blessé"; "Le Jour des Morts"; "La Première Discorde"; "Le Retour des Champs"; "La Sainte Famille"; "Bacchante"; "L'Amour essayant ses Flèches"; "Le Baiser"; "Le Sommeil"; "La Baigneuse"; "L'Invocation à la Vierge" (which forms a decoration in the Church of Saint Augustin); "Enfants Endormis"; "Nymphe et Satyre"; "Après le Bain" (bought by the King of Holland); "Flore et Zéphyre" (in the museum at Mulhouse); "L'Enfant Jesus et St. Jean Baptiste"; "La Vièrge Consolatrice" (in the Luxembourg); "La Naissance de Venus" (also in the Luxembourg); "L'Adoration des Mages" (in the church of St. Vincent de Paul), which gained him the Medal of Honour at the Salon; "Le Premier Deuil"; "L'Offrande à l'Amour"; "La Perle"; "L'Innocence"; etc. Bouguereau also decorated the Salle des Concerts at the theatre of Bordeaux, and executed the mural paintings in the cupola of the cathedral at La Rochelle. Bouguereau was a Professor at the Ecole des Beaux-Arts, much admired and respected by his pupils, several of whom rose to be eminent artists. He was also Honorary President of the Société des Artistes Français, and was a "Grand Officier" of the Legion of Honour.

It is announced that a group of artists and amateurs of art, among whom are two architects, MM. Bonnier and Bouwens Van der Boyen, have founded a School for mutual practical instruction in art. The object of the School, which is entirely unconnected with any official system of training, is to enable artists to gain acquaintance with the principles of other arts than that which each himself practises, but with which he may find himself frequently in close relations. The programme of the School will include visits to and lectures at museums and private collections, and also a certain amount of travel, with expenses shared in common. The operations of the School are to commence in November, and amateurs as well as artists are invited to join it.

The remains of a Roman theatre have been discovered at Champlieu, near Compiègne, which is reported to be nearly as interesting and important as that of Orange. It is proposed to open it out by clearing away adjoining buildings.

M. Rodin has just completed a bust of the dramatist Henri Becque, who died a few years ago. The bust will be placed on a stele which is to be erected at the entrance to the Avenue de Villiers, at the intersection of the Boulevard de Courcelles with the Boulevard de Batignolles.

It is proposed to erect a large building on the site of the old Hôtel Dieu in the Rue de la Bûcherie, for the Ecole des Arts Decoratifs, which is at present very inadequately provided for in an old dwelling-house in the Rue de l'Ecole de Médécine.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

ARRANGEMENTS are in progress for the Institute visit to Newcastle-on-Tyne, where the annual dinner is to be held on Friday, October 13, under the auspices of the Northern Architectural Association. The following is a brief preliminary programme:—

Thursday, October 12.—9 till 11 p.m.: Northern Architectural Association President's "At Home."

Friday, October 13.—9.30 a.m.: Excursion on the Tyne in the steamer *J. C. Stevenson*, kindly placed at the disposal of members by the Tyne Improvement Commissioners. 1.30 p.m.: Invitation luncheon. Visits to places of interest in the city. 8 p.m.: R.I.B.A. annual dinner at the Assembly Rooms, Westgate-road.

Saturday October 14.—Excursions to Hexham or Durham, under the guidance of local members. A special visit has been arranged to Durham Cathedral.

Members of the Institute desiring to be of the visiting party, or to be present at the annual dinner, are urged to communicate with the secretary at as early a date as possible.

The Intermediate Examination and A.A. Students.

The Council of the Institute, on the recommendation of the Board of Examiners, have resolved that the drawings prepared in the Architectural Association Day School may be submitted to the Board of Examiners for admission to the Intermediate examination in lieu of the testimonies of study as required by the conditions laid down in the Institute programme, and if the work is found satisfactory the candidate may be admitted to the examination.

The Council is shortly to confer with the Architectural Association as to the possibility of exempting from the Intermediate examination students who have completed the four years' course in the Architectural Association School.

THE ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

A SCOTTISH district meeting of the Association of Municipal and County Engineers was held at Ayr on Saturday, August 26. The meeting was the first held in Scotland since the completion of the amalgamation between the Scottish and English engineers. The members assembled in the Town Hall, where they were received by the Provost on behalf of the Town Council of Ayr. The President (Mr. A. E. Collins, of Norwich), presided, and there were present Messrs. A. H. Campbell (East Ham), J. R. Wilson (Helensburgh), J. Mallinson (Skipton), J. Lee (Paisley), F. G. Holmes (Govan), D. Burns (Pollokshaws), C. Massie (Falkirk), J. L. Lumsden (Kirkcaldy), T. Nisbet (Glasgow), R. H. Dorman (Armagh), J. Bryce (Partick), hon. secretary, and others.

The Provost, on behalf of the Corporation, offered the Association a hearty welcome to Ayr. He trusted that the meeting would be profitable, and the discussion result in mutual benefit.

The President thanked the Provost for his kind reception, and said they were very proud that the Scottish Association had amalgamated with them.

Mr. Bryce, Hon. Secretary, presented a report upon the progress of the preparation of by-laws for Scotland, and suggested that a circular should be issued to the boroughs asking them to contribute towards the cost of the work, which would be considerable.

On the proposition of Mr. H. G. Holmes (Govan), it was resolved that the boroughs of Scotland be asked to contribute towards the cost of preparing by-laws for Scotland.

Mr. Bryce (Partick) was unanimously re-elected hon. secretary for Scotland.

Mr. Van Lint (Waterworks Engineer of Brussels) then made a statement as to the formation of an association on similar lines for French-speaking countries.

The President expressed gratification at the decision of their *confréres* in France and Belgium to establish an association.

Municipal Works of Ayr.

Mr. J. Young (Town Surveyor and Water and Tramway Engineer) read a paper on some of the municipal works of Ayr. He said the population of Ayr, Newton, and Wallacetown was, at 1901 census, 28,697. At the present time it was about 30,100. The gross valuation of the burgh was 197,000*l*. Ayr, and vicinity, had, for a long number of years, been a popular holiday resort. The population was occasionally increased by anything from 1,000 to 8,000 excursionists in one day during the summer months. The climate of the town was very mild and healthy. The death rate for last year was 18 per 1,000. The rainfall was about 38 in. per annum.

The net cost of maintenance only of the roads for the year ending May, 1904, was 3,288*l*., or about 89*l*. per mile of the whole streets, paved and macadamised, within the burgh.

The River Ayr was spanned by six bridges

within a distance of three-quarters of a mile. The principal road-traffic bridge was the New Bridge, built in 1879 to replace the former bridge, erected in 1788. It was 88 yds. in length by 50 ft. in width, and constructed with red sandstone piers and spandril walls, and granite arches and parapets. There were five spans, of 43 ft. to 48 ft. each. The bridge was of very heavy proportions, massive in design, and cost 15,000*l*. The engineers were Messrs. Blyth & Cunningham. The Victoria Bridge, opened in 1898, was designed and carried out by Mr. John Eaglesham, late town surveyor, at a cost of 9,500*l*. It was 70 yds. long, with arched-rib spans supporting a steel trough-decking for the roadway. The spandrils and parapets were of ornamental design, in cast-iron work. Two bridges carried the railway traffic; the one at the harbour, being for goods only, was of steel construction, and the other to the passenger station was a stone structure of great strength. This latter bridge had a narrow foot-bridge overhung on the west side.

Of the two foot-bridges, Turner's Bridge was a light and elegant steel structure, also on the arched-rib principle, gifted to the town by Mr. A. M. Turner, of Ayr, and erected by him from the designs of Messrs. J. & H. V. Eaglesham, C.E., Ayr, at a cost of about 3,000*l*. The other foot-bridge was the Brig of Ayr, which had recently had a large degree of attention drawn to it from all parts of the world on account of the proposal to take down and rebuild it. The history, historical and literary associations of the Auld Brig, together with the peculiarities in its construction, and a description of its defects would require a paper of itself. Originally erected in the XVth century, it was a splendid example of the constructive skill of the period. It now presented a structure of venerable charm and unique value from an antiquarian standpoint. It had been immortalised in Burn's poem, "The Brigs of Ayr." The Town Council found it necessary, acting on the advice of Mr. B. Hall Blyth, M.Inst.C.E., to close the bridge temporarily last summer, and the author was instructed to put in timber centering and supports to obviate any risks of a sudden collapse. This work, as well as the condition of the bridge, the members would have an opportunity of examining for themselves. Many years ago Mr. Templeton, watchmaker, Ayr, left the whole of his estate—at the expiry of certain life rents—for the rebuilding of the bridge. The amount available for this purpose was about 11,000*l*. The Town Council, after every consideration of detailed reports from Mr. James A. Morris, F.R.I.B.A., architect, Ayr; Mr. John Eaglesham, C.E.; and the Town Surveyor, submitted these to the final examination of Mr. B. Hall Blyth, M.Inst.C.E., and Sir William Arrol, M.P. Acting on the recommendations of these gentlemen, who—with the exception of Mr. Morris—were in favour of rebuilding the bridge, the author was presently preparing plans and specifications for the taking down and rebuilding of the bridge. The main idea was to produce an exact replica of the old bridge, using the present materials—as far as they could be introduced in the new structure—in the same situation as they formerly were in the original bridge. This task was no light one, as the exact position of every stone in the bridge would have to be ascertained, and great care exercised in replacing it in its proper position. The foundations of the piers, which rested on oak cradles, were presently several feet above the river bed, and new foundations would be put in at a depth of about 8 ft. lower. It was proposed to utilise the present centering in the reconstruction of the bridge. A temporary foot-bridge would be constructed for the convenience of the public during the rebuilding.

The streets were lighted by 120 electric arc lamps, 174 electric incandescent lamps, and 290 gas lamps. The cost of the arc lamps of 2,000 candle-power was 230*l*. per annum, of the 16-candle-power incandescent electric lamps 20*l*. 10s. per annum, and of the ordinary 3½ cubic ft. per hour gas lamps 39s. each per annum, which included renewal of carbons, burners, globes, etc. Energy was supplied from the Corporation electricity works. The price paid for electric current for lighting was 2d. per unit, and that for gas was 3s. 4d. per 1,000 cubic ft. The lighting hours per annum were 3,050.

The street sweepings and house refuse were formerly tipped into a quarry within the burgh, but on this being filled up, about two years ago, other means of disposal had to be found. As no places, within a reasonable distance of the burgh, could be obtained, the Town Council decided, after careful inquiry, to erect a destructor on a site adjoining the Corporation electricity works in Mill-street. It adjoined the electricity works, where the steam raised by the destructor boiler was utilised. The buildings were of a plain and substantial character, arranged in two levels, the lower being the furnace floor level, and the upper being the tipping platform level, which was practically at the same level as the adjoining street, and was connected therewith by a bridged roadway. On the lower, or furnace, floor, a Meldrum's "Simplex" Regenerative Refuse Destructor of six grates, arranged in one unit of four grates, and one unit of two grates, with space left for extension to four grates. The grates had an area of 25 sq. ft. each, and could consume 12 tons of refuse per twenty-four hours.

The clinker-crushing plant consisted of a breaker, bucket, elevator, and inclined revolving screens. The capacity of the plant was guaranteed at 3 tons of clinker crushed and screened per hour, the sizes made being 3-16 in., ½ in., and 1 in. from thirteen screens, and "tailing" from 2 in. to 2½ in. from the end of the screen. With the exception of the fine stuff and dust, which came through the 3-16-in. screen, the material was very clean, and had a ready sale in the town. The price obtained 1s. 6d. per ton at the works.

The average cost of consuming the refuse was 1s. 1d. per ton, which included labour and tools.

The cost of the work was as follows:—Buildings, 4,450*l*.; destructor, plant, and machinery, 5,598*l*.; chimney, 706*l*.; total, 10,754*l*.

The original waterworks of Ayr were constructed in 1855, and acquired by the Corporation from the Ayr Water Company under the Ayr Corporation Act of 1873. This supply was derived principally from springs on the Milton and Grange farms, about eight miles to the south of Ayr.

In August, 1899, the Corporation obtained powers under the Ayr Burgh Act, 1899, to supplement the water supply to the burgh and district by the pumping of the water in the Carcluie reservoir to Knockjarder, and the construction of a service reservoir there together with all other necessary works.

The storage capacity of the reservoirs at Carcluie, was Carcluie reservoir No. 1, 13,000,000 gals.; Carcluie reservoir No. 2, 21,000,000 gals.

The two reservoirs had been connected by forming a junction between the two original outlet pipes.

The construction of a service reservoir at Knockjarder had long been found necessary, as the main source of water supply (Loch Finlas) was about seventeen miles distant. The new reservoir would store three days' supply for the burgh and district, and obviate all risk to consumers through accident to the piping fetlock.

The service reservoir was 300 ft. in diameter, and averaged 17 ft. 6 in. deep, and contained, when full, about 7,000,000 gals. It was divided in the centre by a cross-wall 10 ft. high, which enabled the reservoir to be periodically cleaned out, and still retain one day's supply on hand. The floor of the reservoir was of cement concrete, and the walls were of brick in cement, faced with brown glazed bricks.

The water from Loch Finlas was very soft, brown in colour, and contained peaty and suspended matter. Carcluie water was moderately hard, derived from springs, and consequently very clear. The mixture of the two waters, subsidence of the peaty suspended matter, and aëration in the service reservoir had a beneficial effect, and rendered the subsequent filtration more rapid and effectual. The water was drawn off through two floating arm pipes, which decant the water 6 in. below the surface, thus ensuring only the purest water being passed on to the filters.

The water was conveyed to the six filters, or to the two clear-water tanks, by two cast-iron pipes, partly 16 in. and partly 12 in. in diameter. These pipes were controlled by valves at the outlet well, which was also provided with overflow weirs, and a drain 18 in. in diameter.

A new screening apparatus had been fitted up in the pressure-regulating well. The main supply pipes had also been fitted with by-pass pipes so as to allow of this well being emptied for cleaning and repairs.

A new main water supply pipe, about five and a quarter miles in length, partly 15 in. and partly 12 in. in diameter, had also been laid from the filters to Whitletts-road for the supply of the high-level districts of Castle Hill, Craigie, Hawkhill, and Whitletts.

The whole of the extension works had been carried out under ten different contracts, from the author's designs, at at total cost of about 37,000*l*.

The daily supply delivered to the burgh and water district was about 2,250,000 gals. Besides the supply to the burgh and outlying districts, large quantities of water were supplied to institutions, railways, shipping, public works, estates, etc. The annual revenue was about 9,200*l*., and the present water-rate within the burgh was 10d. per pound on rental.

Mr. A. H. Campbell (East Ham) proposed a vote of thanks to Mr. Young for his valuable contribution to the Association, which was supported by Mr. R. H. Dorman (Armagh) and others, and carried.

The Corporation entertained the members to luncheon, and the afternoon was devoted to visits to the electricity and destructor works, the "Auld Brig," the infectious diseases hospital, and the Burns' memorial and birthplace.

ADMINISTRATION BY MUNICIPAL ENGINEERS.*

ONE of the prime essentials to the efficient administration of a municipal engineer's department is a sufficient and qualified staff. Unfortunately, some local authorities do not appreciate the importance of the former, but the author is fortunate in serving a corporation who, demanding a high standard of efficiency, recognise that the expenditure required to provide a sufficient staff is money well spent, and is necessary if the work is to be carried out with the greatest economy. It is, however, of the utmost importance that the greatest care be exercised in selecting each member of the staff—from the office boy upwards—and it is the author's practice before making an appointment to insist upon a personal interview, and to make careful inquiries as to the ability and, where possible, the personal character of the prospective assistant. Strict discipline is undoubtedly of the greatest advantage to both employer and employed.

In most of the larger offices a time book is kept, and each member of the staff is required to sign his name on and to enter the time of arrival and departure. It is suggested by some that a system of this kind involves some sort of hardship, but in the author's opinion it is of the greatest value, especially to those who have to sign.

To ensure the highest degree of efficiency, it is essential that, as far as practicable, every member of the staff should have his duties clearly defined. These should be set out in writing, and a copy handed to each man on appointment. By this means individual responsibility is fixed, the work can be fairly divided, and any shirking is soon detected.

In the preceding paragraphs the office staff has been specially referred to, but even greater care should be exercised in the selection of the outdoor staff, as they cannot be kept under such close supervision, nor can their work be checked so effectively. Moreover, in their case any neglect of duty may remain undetected for a considerable time, with serious results.

It is unreasonable to expect the best results from badly-paid *employés* of any grade, and the author has found by experience that it is the highest economy to pay even more than other people and so get the

* Part of a paper read by Mr. E. J. Elford at the annual meeting of the Incorporated Association of Municipal and County Engineers, held at Norwich, June 22, 23, and 24.

pick of the men than to pay less and have to take what others leave.

The author is no believer in too much red tape, but a certain amount of this useful article is indispensable in any business if it is to be successful. Everything must be done in order, proper records must be kept, necessary rules enforced, and the details of the organisation so arranged that each individual knows his duty thoroughly and does it effectively.

One book which is neglected in some offices, but which the author has found to be of great value when properly kept, is the "call book." . . . A large number of the books used in the author's department are arranged on the "manifold" principle. For instance, each of the clerks of works, foremen, and inspectors is provided with a printed manifold report book, and is required to send to the office a daily report containing such particulars as the number of men employed, the work completed and in hand, and other details. These reports are filed as received, and the book is returned to the office when full or when a contract is completed, thus providing a complete and permanent record of the work. A form from a small special report book, printed on pink paper, is used when reporting any matter of special importance or urgency. This attracts immediate attention.

Each foreman is provided with a "manifold" requisition book, from which requisitions are sent to the office. These are examined and, if approved, countersigned by the engineer.

No orders for goods are issued except upon official order-forms, to which are attached printed invoice-forms, which must be returned by the suppliers as soon as the order is executed. This invoice must be signed by the person receiving the goods, and, after being checked by the chief clerk, it is certified by the engineer before being passed to the borough accountant for submission to committee.

A "general record" book, if properly kept, will be found of great convenience for reference. The book should contain, in concise form, particulars of the various works under the control of or constructed by the engineer's department.

For instance, the size, stroke, revolutions, capacity, cost, age, and other information in regard to various engines, pumps, and other machinery should be given; also the number and character of lamps, street trees, hydrants and standpipes of various kinds; the length of tramway track, size and weight of rails, points, fish-plates, bolts, bonds, and so on.

An important section of a municipal engineer's department is the drawing office, which at Southend is placed under the immediate supervision of the chief engineering assistant. After each council and committee meeting particulars of the drawings, etc., required are entered in a "drawing office instruction book," and it is the duty of the chief engineering assistant to see that these are prepared, and when allocating the work to enter into the book the following particulars, viz. :—(1) Description of work, (2) date of instruction, (3) when required, (4) name of draughtsman, (5) date commenced, (6) date completed.

In most cases when a drawing has been prepared in pencil a linen tracing is taken, and from this are made photo-prints as required, the drawing being finished off afterwards. Every drawing is numbered and indexed as soon as it is commenced, and on completion is filed in the plan-room. The tracings are carefully preserved, so that photo copies can be taken at any time if and as required. Plans deposited in respect of proposed new streets and buildings are filed in linen-lined envelopes. These are 12 in. by 5 in., each containing one set of plans, particulars of which, with the date deposited, date approved, official number, etc., are entered on the front in spaces provided for the purposes. Each of the drawings is also marked with the official number, and stamped with the date received. The numbers run consecutively, and the envelopes are filed in pigeon-holes side by side in that order. Each pigeon-hole has marked below it the first and last number contained therein, so that any plan can be found in a few moments.

In the author's borough the drains of every new house are twice tested—first by water before they are covered in, and again, on the completion of the building, by smoke. The building inspectors are required to enter regularly in a book provided for the purpose a complete record of all visits paid to new buildings, with particulars of the size and inclination of drains, nature of foundation, size of timbers, and other details of importance. As an adjunct to a drawing office a camera is most useful. The author makes it a practice to keep a photographic record of every job of importance. The photographs are taken during the progress of the work at regular intervals, and the negatives are carefully dated and indexed. A large number of photographs are also taken from time to time in connexion with building prosecutions and other litigation, and to assist in meeting objections under the Private Streets Works Act and other statutes.

In most towns of any importance it is now usual to have annual, biennial, or triennial contracts for the supply of stores of various kinds and of team labour. This system is probably the best yet devised, although it is not free from imperfections. It is essential that specifications and contracts should be drawn with the greatest care and exactness, and that all goods should be thoroughly examined and tested on delivery, as, unfortunately, there are a number of firms who make it a practice to tender at cutting prices for the supply of goods of this kind, and who, having secured the contract, endeavour to make it pay them by procuring the acceptance of the most inferior and unreliable materials.

Inferior picks of foreign manufacture, bolts and nuts of low-grade iron that fracture under the slightest pressure, brooms of the "best Bahia bass" (*sic*) that wear out in a week, castings of maximum weight and minimum quality, and many other articles of the cheap and nasty kind, most of which can only be detected by experienced men after careful examination. The contractor knows that in many cases the materials are required for immediate use, and that, if not too obviously worthless, they are likely to be accepted to avoid the inconvenience and delay which would be occasioned by their rejection. The author has endeavoured to meet the difficulty to some extent by stipulating that the contractor shall repay to the corporation the cost incurred by them in receiving, testing, and returning rejected goods, and that, in addition, the engineer shall be entitled to purchase elsewhere materials equal to the quality specified in place of the rejected goods, and to charge the extra cost to the contractor. These conditions, if strictly enforced, have a very beneficent effect. Samples of each article to be included in the contract are provided for the inspection of persons tendering, and this saves much subsequent difficulty, though it does not entirely prevent disputes.

One of the most troublesome contracts is that for the supply of team labour. It is hardly practicable to provide a sample horse and driver, and the difficulty is not generally in regard to the carts supplied. The author has found the usual cause as to the rejection of inferior horses quite ineffectual. Assume, for instance, that half a dozen horses are rejected on arrival in the morning. They are sent back to the contractor, whose only loss is, say, from half an hour to an hour on each horse. On the other hand, the work of the corporation, having been previously arranged for the day on the assumption that the six hired horses referred to would be available, is disorganised and thrown into confusion, and portions have to be neglected, because by the time the defective horses have been discovered and sent home it is too late to obtain suitable substitutes elsewhere. In consequence of this difficulty the author has introduced into his specification a clause stipulating that the contractor shall forfeit the sum of 2s. 6d. in respect of every horse rejected. This has had a most satisfactory effect, as only those firms who are able and willing to supply proper horses care to submit tenders. With such a clause consistently enforced, there is no temptation to others to tender, and in consequence the rejections are now practically nil. Of course, the rates charged are somewhat higher, but this extra cost is covered many times over by the higher quality and greater quantity of the work, for in this respect, as in most others, the best is the cheapest.

The author includes as much work as possible under the piece work or "mileage" part of the contract, as he finds that, where the quantity of the material to be carted can be accurately ascertained, the work is generally done cheaper and more promptly when the contractor is paid a fixed price per unit of measurement or weight according to the distance carted.

One of the author's most important contracts is that for the supply of stoneware drain and sewer pipes. The Southend Corporation purchase direct from the maker all pipes of this kind required for use in their works, and issue them to the contractor where one is employed. The pipes are required to be issued at the corporation depôt, where they are thoroughly examined and tested before being accepted. Under this system it is possible to make a more effective examination of the pipes than if they were supplied by the contractor and sent directly on to the works. The cost of delivery to the depot is more than covered by the saving which results from dealing direct with the maker. Tender forms for pipes, ironmongery, tools, cast and wrought iron, and other contracts covering a large number of items contain a fixed schedule of prices, and persons tendering are required to state in their tenders the percentage above or below these schedule prices at which they are prepared to supply. This facilitates comparison and saves considerable trouble in allotting the contracts, and it is less open to the objection that those who are familiar from experience with the quantities generally used have an advantage in tendering. The harness contract is divided into two parts. The first includes the repair of all harness in use in the stables at a fixed price per horse per annum, based upon the average number of horses sleeping in the stables during each quarter. The second portion includes new harness and sundries, such as halters, bandages, brushes, combs, nosebags, composition, and other minor requirements.

Probably many of those present have experienced more or less difficulty in securing the prompt rendering of accounts payable by an authority. The author includes in all his contracts a clause stipulating that accounts shall be delivered by the second day of each month for the goods supplied and work done during the preceding month. Failure to comply with this requirement results in a deduction of 5 per cent. being made.

It has often occurred to the author that something might be done—possibly by this Association—to provide at a reasonable cost analytical reports and expert advice as to the quality of various materials used in corporation work. The author refers more particularly to such materials as engine and other oils, paints, red and white lead, petroleum for lighting and for use in internal combustion engines, disinfectants, varnishes, creosote, and other materials, which only a qualified chemist can properly test. Buyers of such materials are undoubtedly exposed to much fraud, and the matter is certainly of great importance to local authorities. Portland cement, stoneware pipes, and a few others are generally the only materials the testing of which engineers themselves undertake, and unless samples of the other materials supplied are submitted to a qualified expert from time to time for examination the authority is likely to suffer serious loss. Anyone who has had much experience in the use of engine oils, for example, knows what an enormous difference there is in the intrinsic value of various samples of this material, and how difficult it is without an analytical report to establish adulteration and fraud. The author is in the habit of obtaining analytical reports in respect of samples of mortar, taken under the building by-laws, and in connexion with any important painting contracts he always specifies that the whole of the white lead shall be delivered on the works at one time, so that he may take samples from the bulk for analysis. This procedure is also adopted in regard to some other materials.

Much has been written and said lately

in regard to the "burden of the rates." As municipal engineers are responsible for a large proportion of the expenditure of the local authorities throughout the country, the amount of these rates must be influenced to an appreciable extent by the efficiency or otherwise of the engineer's administration. The whole subject is undoubtedly of considerable importance, and, although as an association it is not our province to discuss the political or economic aspects of the question, it is both our duty and our interest to do all in our power to prevent wasteful or unnecessary expenditure, and to see that the ratepayers receive full value for their money. To effect this, it is necessary that every item of expenditure should be carefully watched, and the greatest care taken to prevent slackness in any department.

The author finds that the simplest and most effective method of doing this is by means of what he may term "expenditure charts." Enlarged copies of some of the charts—kept in his office—are before the meeting. Practically every branch of expenditure by the author's department is now the subject of a chart of this kind. It will be observed that, upon the chart relating to the removal of house refuse, are plotted curves, representing the variation in the total cost of the work month by month, and the relative cost of manual and team labour, also the number of men and horses engaged; and what is called the "estimate line," which represents the amount allowed in the estimate for the year spread evenly over the whole period; and a "population curve," which indicates, for comparison, the growth of the population. On the "scavenging" chart is plotted the manual labour curve, team curve, and total expenditure curve, as well as the estimate line. On the "steam rolling" chart is plotted the number of days worked and the cost of fuel, etc., and on the "pumping station" chart the curves represent the gallons pumped, gas consumed, and rainfall.

A glance at any one of these charts is sufficient to show how the cost compares with the estimate, and to enable the engineer to detect and investigate immediately any appreciable variation in the former. The reason for such variation is noted on the chart, so that, should it be found at the end of the year that the estimate has been exceeded, an explanation can at once be given. The chart is also of value in connexion with the preparation of estimates for the ensuing year.

In regard to expenditure on new works, carried out by direct labour, a prime cost book is kept. This is not only of great help in connexion with the preparation of estimates, but it also enables the engineer to follow closely the cost of various jobs during their progress. The author has found it convenient to have two or three sets of the general conditions, specification, and quantities, relating to the various contracts in hand, bound up in cheap covers, as soon as they are received from the printers. After the acceptance of a tender the copies of the quantities are priced out, and the whole of the documents relating to any contract are thus available for reference at any time. The author also has several sets of the annual tenders for stores and cartage bound in a similar manner, and priced out as soon as the contracts are let. This is found a great convenience in checking accounts, and for reference generally.

The efficient scavenging of a town is now recognised as having an important influence upon the health of the inhabitants. In organising this work, it is well to divide the town into districts, and to appoint to each a sufficient number of scavengers to work under the direction of a district foreman. Where posible, each district foreman should be provided with a small office or depôt, from which his men can start, and where brooms, tools, books, and other accessories can be kept. A drawing of the district office used for this purpose at Southend is before the meeting. It will be observed that it is about 7 ft. by 5 ft., and 6 ft. 6 in. high, with a desk at one end, and a cupboard to contain the foreman's books.

It is convenient, economical, and satisfactory to make each district foreman responsible for reporting such matters as the following—viz., damage to carriage-ways, footpaths, street trees, or tree-guards, overhanging trees, obstructions, defective gulleys, and other matters of a like character.

In towns where a large number of street trees have been planted, it is advisable to keep scavengers supplied with a small quantity of yarn, and to instruct them to tie up any trees that may have become unsecured. By this means valuable trees may often be saved. Another matter, which the author finds it of advantage to make the district foreman responsible for, is that of openings in public roads and footpaths. Probably most of those present have had more or less trouble in dealing with this matter, and have suffered both in time and temper by having roads disturbed immediately after they have been nicely made up and repaired.

In the author's borough, every person who desires to open a public road or path is required to pay a deposit, and to sign a printed form containing an undertaking to execute the work expeditiously and with care, and to be responsible for the lighting, guarding, and condition of the trench, and for the restoration thereof, and for any accident or damage caused thereby.

Deposits in respect of carriage-way openings are returned after the expiration of six months, if the road surface has been properly restored and maintained in a satisfactory condition during that period. The deposits in respect of openings in footpaths are retained by the corporation, who insist upon executing all repaving work by their own staff.

Before making up a road, or executing any extensive repairs, it is the author's practice to give notice of his intention to the gas and water companies, and others having mains, etc., in the road, with the request that they will carry out any alterations or extensions of their plant they may have in contemplation, before the road works are commenced. This often results in a saving both to the ratepayers and to the company affected.

Each of the district foremen is supplied every morning with a list of the openings sanctioned in his district on the previous day, and it is his duty to report immediately any unauthorised openings or dangerous trenches.

In many towns considerable difficulty is experienced in disposing of road sweepings, and frequently they have to be conveyed long distances. Street orderly bins are in common use as temporary receptacles for road sweepings, which are collected at intervals by ordinary carts. It has always appeared to the author that these bins are open to grave objection. They are obstructive, unsightly, and insanitary. They are not economical, because their contents have to be handled two or three times; they cannot be kept thoroughly clean, and are, in consequence, often most offensive. These objections led the author to devise a system for the collection and removal of road sweepings. A short description of it may be of some interest to the members of this association, as in practical work at Southend it has been found to give very satisfactory results. For the collection of the sweepings, there are made, in the corporation workshops, specially-designed hand-carts.

The subject of street watering has been much discussed lately, as a result of the introduction of various preparations alleged to possess the quality of preventing dust. The author must admit that his own experience has not very favourably impressed him in regard to the efficacy of these dust layers. By their use the dust is certainly kept down longer than by the use of water alone, but there appears to be a tendency to exaggerate their capabilities in this direction, and, in the author's opinion, the cost must be greater than usually stated.

Apart, however, from any question of expense, there is, in the author's opinion, much to be said in favour of the use of water alone as a dust-laying agent. In a thoroughfare used to any appreciable extent by vehicular traffic, there must be, even with the most impervious surface, a more or less constant deposit of offensive matter, which is quickly ground to fine particles by the passage of the traffic, and which, in dry weather, becomes dust of a highly dangerous and unpleasant kind, unless the road is kept in a moist condition. This can only be done by constant watering, which not only prevents dust, but also cleanses the road surface. In addition to this, the water cools the air and increases its humidity—two effects which are both pleasant and healthful. This, of course, is of special importance in residential districts.

In regard to road maintenance, the author has found that the highest efficiency and greatest economy are attained by making the district foremen personally responsible for the condition of the roads in their respective districts. It should be the duty of the district foreman to attend promptly to any patching and repairs, and he should be provided for the purpose with sufficient suitable material at convenient positions in his district. For macadam roads the patching material should be small, and the work should be carefully, skilfully, and regularly executed. If this is done the life of the roads will be very much extended. They will wear more evenly, the concussion resulting from the passage of traffic over an excessively rough surface will be avoided, and water will run off more quickly.

The labour question is one of great importance to local authorities, especially having regard to the tendency to increase the proportion of work executed by direct labour, in consequence of which a larger number of towns employ a considerable staff of workmen of various grades, the wages bill frequently reaching 10,000*l.* to 20,000*l.*, or even more, per annum. The municipal engineer has, therefore, in addition to his other duties, to manage and direct an extensive and important business undertaking. Success in this direction can only be attained by the efficient organisation and strict supervision of labour, and by the possession of thorough experience of the value and character of materials and plant. It is somewhat difficult to deal generally with the question of organisation, as each town must be considered, to a great extent, on its own merits, in view of its special circumstances and local conditions. Perhaps the most important principle of general application is that of individual responsibility. As far as possible each man's duties should be clearly defined, and he should be given as much work as he can efficiently perform—but no more. It is generally found that the best results are obtained by placing one man in charge—under the engineer—of the whole of the outdoor work. Under this one man are district and depôt foremen and inspectors in charge of various sections of work, and they, in their turn, are assisted by sub-foremen and gangers. The appointment of a supreme head promotes co-ordination, prevents friction, and saves waste of labour and materials. The author is aware that in some towns this principle is not followed. The work is divided into a number of, more or less, separate and independent departments. For instance, one man is in charge of road work, another of scavenging, another of the collection of house refuse, and so on. Such an arrangement must, in the author's opinion, militate against efficiency, and result in more or less waste. It means, probably, that carts are often loaded one way when they might be loaded in both directions; that one department will, at times, be paying for the removal and disposal of material which would be of value to another department; and that on occasions there is, in one department, a temporary overplus and consequent waste of labour which might have been profitably employed elsewhere.

THE LATE MR. WATERHOUSE.

THE funeral of the late Mr. Alfred Waterhouse, R.A., took place on Monday in the churchyard of Yattendon, some six miles from Pangbourne. Unfortunately, heavy rainstorms prevailed during the day, but, in spite of the weather, a numerous body of relatives and friends assembled from all parts at the graveside. The coffin was borne on a hand bier by the estate workmen from Yattendon Court. Among the members of the family present were Mr. and Mrs. Paul Waterhouse, Miss Waterhouse, Mr. Amyas Waterhouse, Mr. Michael Waterhouse, and Mr. and Mrs. Edwin Waterhouse. Others present included Sir Edward and Lady Fry, Mr. G. Redmayne, Mr. Thomas Hodgkin and Miss Hodgkin, Mr. Elist Hodgkin, Mr. Howard Hodgkin and Mrs. Hodgkin, Miss Hodgkin,

Miss A. M. Hodgkin, Mr. Wilson Crewdson, Mr. Crewdson Waterhouse, Mr. Leonard Redmayne, Mr. Paul Bevan, Mr. Wilfred Hardcastle, the Rev. J. Forrest, past and present members of Mr. Waterhouse's architectural staff, Professor Elsey Smith and Mr. Driver (representing the Architectural Association), Mr. Alexander Graham, Mr. G. Northover, and Mr. J. C. Tanner (representing the Royal Institute of British Architects), Mr. Thomas W. Cutler (representing the Royal Sanitary Institute), Rev. Canon Beeching and Rev. H. Bowden Smith (former Rectors of Yattendon), Sir W. Cameron Gull and the Hon. Lady Gull, Mr. Acland, K.C. (Recorder of Oxford), and Mr. George William Palmer.

To the list of works given in the obituary notice in our columns of August 26 should be added No. 18, Lincoln's-inn-fields, north side, the offices of the Equity and Law Life Assurance Company. The elevation of stone is an example of his earlier work in London.

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION.—The exhibition of drawings and photographs, illustrating researches in the higher refinements in the architecture of mediæval buildings, will be held in the National Portrait Gallery, Queen-street. It will be opened on Wednesday, September 6, at four o'clock, by the Right Hon. the Earl of Wemyss and March.

Correspondence.

SECRET COMMISSIONS.

SIR,—We are not a little surprised at Mr. Quennell's letter in your last issue.

That such an attempted dishonest transaction as he refers to may have occurred we do not question, but we do emphatically affirm that, if the instructions were "that this 15 per cent. was not to figure on the invoice, as *in due course the same would come before the surveyors.* . . and that this is the *general* method," such instructions would certainly not be acted on by any respectable quantity surveyors in settling up the variations.

After a long experience we can say that we have never known of such an attempt being made, and we regard the statement that the "general method" of surveyors in making themselves parties to swindling transactions of this sort is a libel on the profession. YOUNG & BROWN.

'OLD BUILDING, BROAD-STREET."

SIR,—With reference to Mr. J. Stannah's letter to you in last week's issue of your paper, inquiring as to the period of the "old" work laid bare through the demolition of the adjoining buildings, I shall be pleased to give Mr. Stannah access to the site to enable him to examine the work to which he refers. I am, however, afraid that disappointment will be in store for him, for the stone walls to which he refers are only bricks painted white, and the windows only stucco decorations on the wall, and, in fact, the whole "very quaint bit of architecture" is only a decorative device of no very "ancient" date to hide the plain brickwork of the adjoining church.

PAUL HOFFMANN.

SIR,—Some time ago I was asked by the Rev. Montague Fowler, the Rector of All Hallows-on-the-Wall, to examine what Mr. Stannah supposes to be ancient architecture.

I found it to be a whimsical romance in stock bricks and plaster.

I understand it was "stuck up" by a dentist, who had chambers in the buildings now being pulled down, and who wished to make his back yard "pretty." So he plastered over the circular vestry, which Dance had built on the bastion of London Wall, and ornamented it, and some sheds in his yard, in the Gothic manner.

A. W. VENNER.

SIR,—The "quaint bit of architecture" mentioned by Mr. J. Stannah in the letter you printed on August 26 is of brick, and stands against the north wall of All Hallows Church, which is in alignment with a piece of the old City wall. It is not an integral part of the church, nor is it the vestry. The adjoining vestry, on the west side, projects much further from the church, and, it is supposed, takes its rounded shape from being raised upon a bastion of the City wall. The fragment comprises a curved wall, only one brick in thickness, which abuts against a long and thicker brick wall built out at a right angle from the north wall of the church. At the return of the long wall, remoter from the church, is a fireplace. The long wall, the curved wall, and another modern curved wall (for the stairs from the vestry to the pulpit) extending from the church wall, enclose a small space, which is entered, through a door in the curved wall, from the cleared ground which was formerly the town ditch, since traversed by New Broad-street. The walling of the fragment is white-washed; courses and festoons of large pebbles or unchipped flints are fantastically embedded in its face; and it is pierced—with no regard to symmetry of arrangement—with several small pointed windows, blocked openings, and, at the upper stage, a slightly convexed two-light pointed window, unglazed. At the sill of each of the two lancet-shaped openings is a projection in the form of a half-bowl or stoup; a similar pointed window is inserted in the brick wall of the vestry. Of the houses just pulled down on the south side of New Broad-street two or three abutted, it is evident, against the City wall and the church, but a space intervened between the other houses and the vestry and the fragment in question. D.-M.

THE ARCHITECTURAL ASSOCIATION PHOTOGRAPHIC COMPETITION.

SIR,—I wish to bring to your notice that a photographic competition is held annually by the Architectural Association Camera and Cycling Club, and is open to all members of the architectural profession.

The Council of the Association offer a prize of three guineas for the best set of prints submitted.

The main conditions are as follows:—

(1) The competition is confined to sets of photographs adapted for the purposes of architectural study.

(2) Each set should consist of not more than twelve prints, and should illustrate one subject or class of subjects.

(3) Copies of the winning prints by a permanent process must be deposited with the Architectural Association before the prize is presented to the winner.

(4) Photographs must be sent to the Secretary of the Architectural Association Camera and Cycling Club at 18, Tufton-street, Westminster, not later than October 1.

(5) The judging will be first of all by the Committee of the Camera and Cycling Club as to the prints having reached a fair standard of technical excellence, and will then be finally adjudged by an authority on architecture (not a photographer) appointed by the President of the Architectural Association.

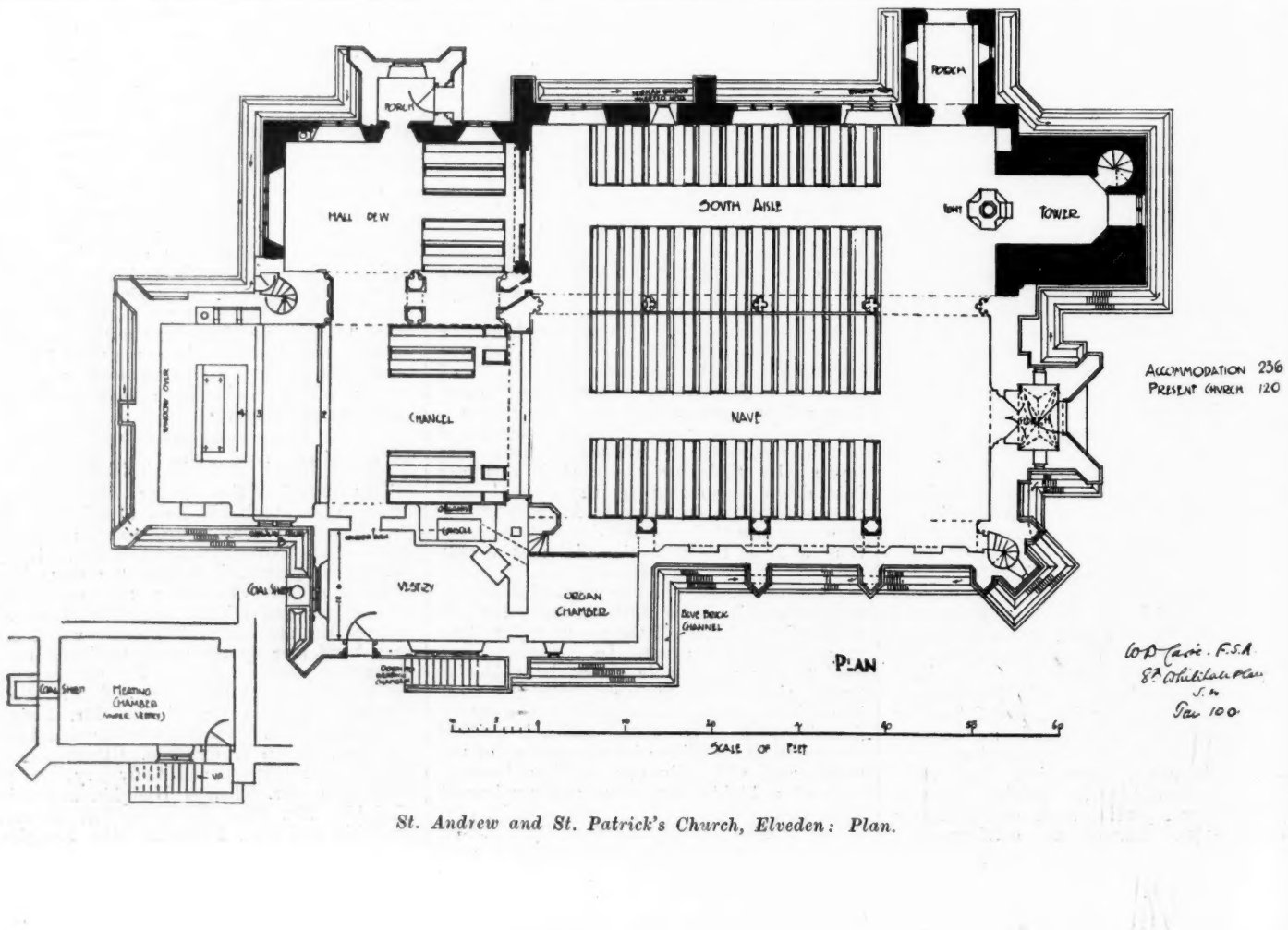
The judge appointed by the President this year is Mr. Arthur Stratton. I shall be pleased to send further particulars to intending competitors.

FRANCIS R. TAYLOR.
Hon. Sec. A. A. Camera and Cycling Club.

Illustrations.

HULL TOWN HALL AND LAW COURTS.

OWING to the demand of the authorities for four law courts on the ground floor, instead of three on the first, the whole of the building has had to be remodelled, thus enabling the architects (Messrs. Russell & Cooper) the opportunity of designing this and the municipal portion as one composition, the centre of which is treated with a deeply-recessed arch over entrance. with sculpture symbolical of the interests of the city.



St. Andrew and St. Patrick's Church, Elveden: Plan.

The exterior is in Ancaster stone; the columns, which are entirely detached, are of Darley Dale.

The Law Courts are now being built, and the remainder will follow at their completion. Messrs. Quibell, Son, & Greenwood, of Hull, are the builders, and Mr. J. Fraser the clerk of works. The drawing was exhibited in this year's R.A.

ST. ANDREW'S, ELVEDEN.

THE Church of St. Andrew, Elveden, went through a process of XIXth century restoration some thirty-five years ago, which sadly affected its antiquarian interest.

The growth of the parish has involved an extension of the accommodation, which has been undertaken by Lord Iveagh. The old nave will become an aisle, and the chancel a side chapel, the interesting early XIVth century features of the old chancel being maintained.

The work is being executed by Messrs. Cornish & Gaymer, of North Walsham, from the design of Mr. W. D. Caröe.

BRISTOL CENTRAL REFERENCE LIBRARY.

THE principal feature of this building is the large reference-room in the first floor extending along the whole front to Deanery-road.

The Bristol-room, for the reception of old MSS., etc., adjoins the reference-room, and will be fitted with the old oak fittings (including a carved fireplace by Grinling Gibbons) from the old King-street library.

The librarian's offices and workrooms are on this floor, and face towards Lower College-green. On the ground floor are the news and magazine rooms, and the lending department.

The entrance-hall has a vaulted ceiling, covered with sky-blue glass mosaic. The walls and piers are lined with marbles, Greek cipollino being used for the dado, Irish green for capping, and grande antique for skirting. The floors are covered with slabs of Piastraccia marble. The basement contains newspaper-room, specification of patents room, and book store, etc.

In designing the building, an attempt was made to mass the new work harmoniously with the old abbey gateway adjoining.

The three large figure panels over the central bays are the work of Mr. Charles Pibsworth, and represent Chaucer (with his Canterbury Pilgrims), Bede, and Alfred.

The carved enrichments and shields are by Mr. W. Aumonier. The heraldic glazing to the hall, staircase, reference-room, and Bristol-room is by Mr. Benjamin Nelson.

The furniture and fittings are specially designed by the architect.

Messrs. Willcocks & Co., of Wolverhampton, are the builders. H. PERCY ADAMS.

WINDOW, CHULMLEIGH CHURCH, DEVON.

THE memorial window to the late Rector of Chulmleigh, which was put up in 1903, was designed and executed by Miss C. C. Townshend.

Central light—St. Martin of Tours dividing his cloak with the beggar, and in the predella below the parable of the Good Samaritan.

Right-hand light—St. Boniface of Crediton representing the Southern Church. In his hand he holds an axe, emblematic of the hewing down, single-handed, of a huge sacred oak of Thor, whereby he converted a pagan multitude.

Left-hand light—St. Cuthbert of Lindisfarne representing the Northern Church; and below, the parable of the Sower, typifying the preacher.

The canopy is silvery in effect, being composed of a variety of glasses, very light in tone, so mingled as to be neither predominantly yellow, green, nor grey—an attempt to reproduce in tone what passes for white in XVth century glass. Glass of that period owes fully as much to the pearly quality of its whites as to the purity of its brilliant colour. St. Martin is in steel and leather, with a ruby cloak. St. Cuthbert's cope is in yellow stain, running to orange in places. St. Boniface's cope is green, with a border of little figure panels containing scraps of red, blue, and yellow. The background behind the figures is purple, and behind the canopies blue. The window is heavily leaded, most of the glass being in very small pieces. This produces a very mosaic-like effect.

With the exception of the cutting, leading, and firing, the window was carried out by the designer. She superintends the cutting of the glass herself, chooses the actual pieces, and makes her own "cutlines." She also does all the painting on the glass herself.

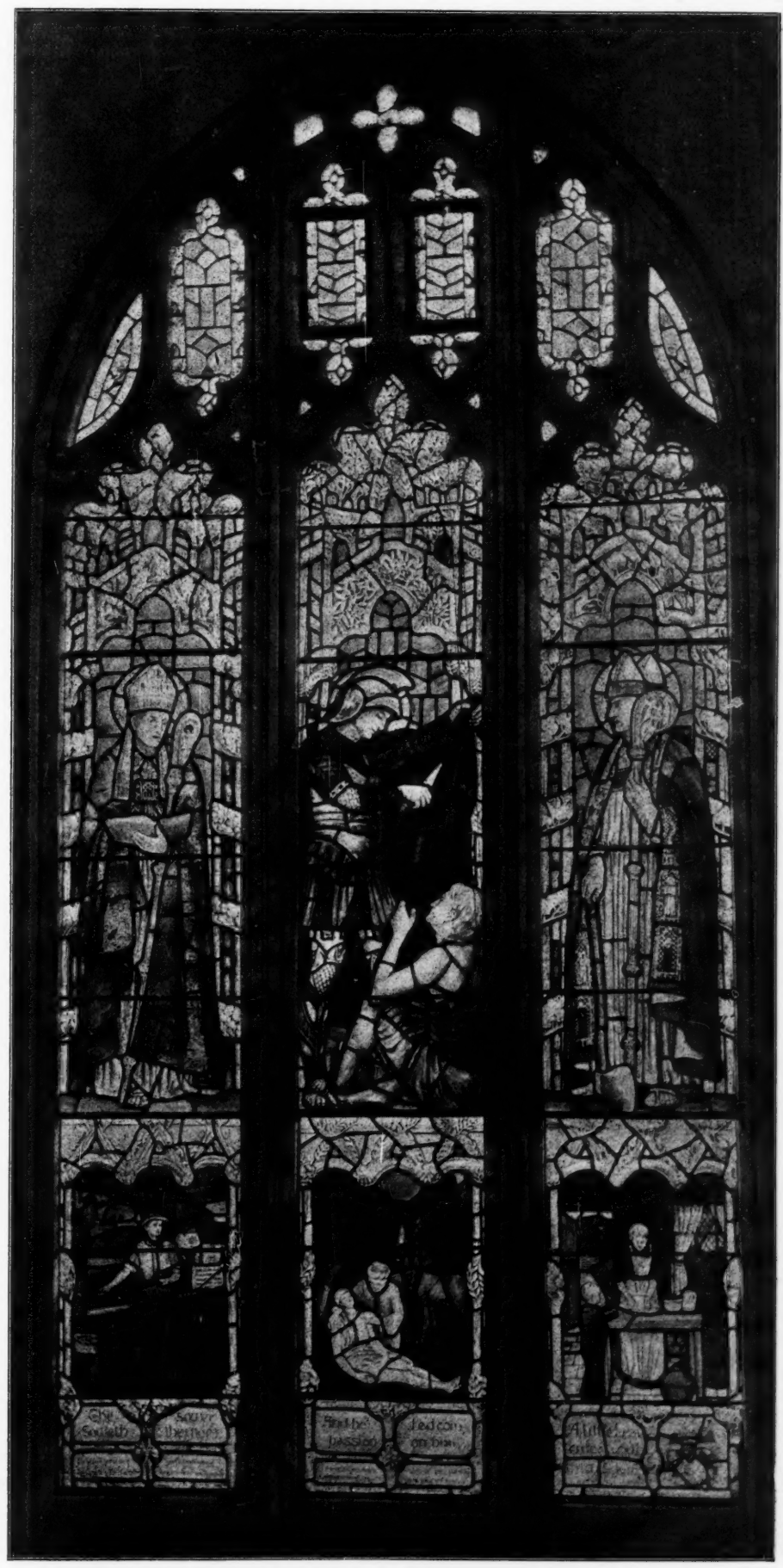
The illustration of the Gateshead window should have been given on December 17, 1904, when we published a double-page plate of the east window.

BOOKS RECEIVED.

LEATHER FOR LIBRARIES. By E. W. Hulme, J. G. Parker, A. Seymour-Jones, C. Davenport, and F. G. Williams. (London: The Library Supply Company, 181, Queen Victoria-street, E.C. 1s. 6d. net.)

THE BRASSWORKERS OF BERLIN AND BIRMINGHAM: A COMPARISON. Joint Report of R. H. Best, W. J. Davis, and C. Perks. (London: P. S. King & Son, Westminster. 1s. net.)

BRITISH PROGRESS IN PUMPS AND PUMPING ENGINES. By P. R. Björling (National Engineering and Trade Lectures, Vol. II.,

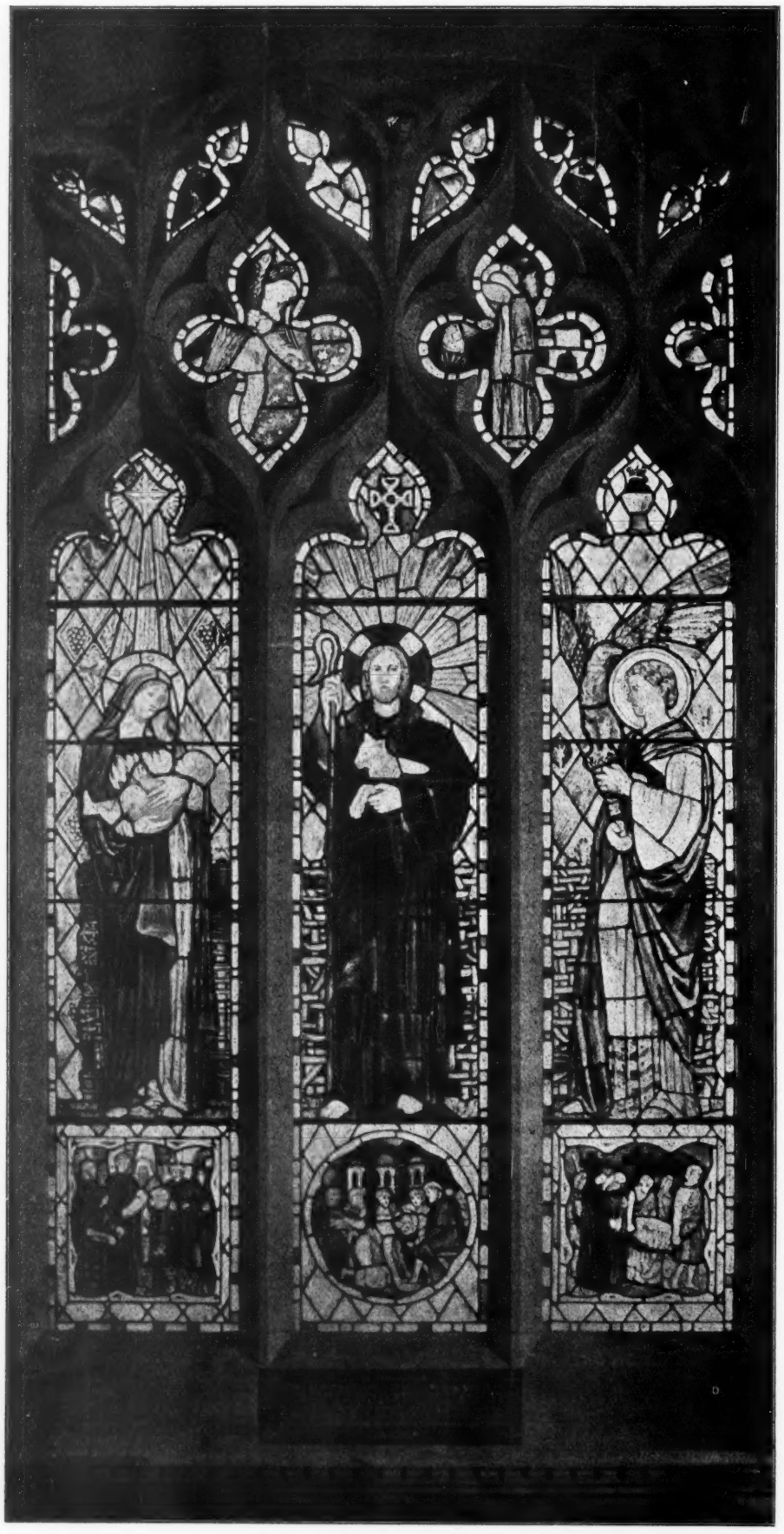


Window, Chulmleigh Church, Devon.

Edited by Ben H. Morgan). (London: Archibald Constable & Co., Ltd., James-street, Haymarket. 6s. net.)

BRITISH PROGRESS IN GAS WORKS' PLANT AND MACHINERY. By C. E. Brackenbury, A.M.Inst.C.E. (National Engineering and Trade Lectures, Edited by Ben H. Morgan, Vol. III.). (London: Archibald Constable & Co., Ltd., James-street, Haymarket. 6s. net.)

ORGAN CASE, ST. PAUL'S SCHOOL.—In reference to the organ case illustrated in our last issue, the name of the firm who executed the work is inaccurately stated. The work was carried out by James Garvie & Sons, of Aberdeen, and Little Britain, E.C.



Window, All Saints' Chapel, St. Chad's, Gateshead. Designed by Miss C. C. Townshend.
(*See page* 255.

The Student's Column.

STEAM BOILERS AND PIPES.—IX.

BOILER SETTING (*continued*).

THIS week we deal with the setting of various forms of cylindrical boilers, which are treated in a manner somewhat resembling that adopted for the Cornish and Lancashire boilers.

Special varieties of Cornish and Lancashire boilers are seated in very much the same way as ordinary types, but with such modifications in matters of detail as may be demanded by distinctive features of design.

The setting for the Cornish multitubular boiler, illustrated in Fig. 5, p. 18, and the Lancashire multitubular boiler, mentioned on the same page, ought to be arranged so that the furnace gases pass through the large and small tubes in succession, proceeding next beneath the bottom of the boiler, and finally along each side to the main flue, as described and illustrated in Articles VI. to VIII.

A less expensive, but, at the same time, a far less efficient, method is to allow the products of combustion to pass through the furnace and fire tubes, and from the latter direct into the main flue.

This arrangement is illustrated in Fig. 40, where it will be seen that the boiler is supported on seating blocks incorporated in three dwarf cross-walls, so that the bottom of the shell is very little above floor level, and that the downtake flue leads to the main flue, which, in this case, is shown below the same level. A shallow blow-off pit is the only other detail requiring brickwork, and as no bottom or side flues are required the body of the boiler can be left without other covering than an adequate lagging of non-conducting material. If preferred, the boiler could be supported entirely by brickwork, or the brick walls between the seating blocks might be omitted.

The cross-walls need not be more than 9 in. thick for small boilers, and 14 in. thick for the larger sizes. It is very important that the bearing surface should be reduced as far as possible by using bricks of semi-circular cross-section at the top of each cross-wall. These walls may be connected longitudinally by brick paving, or, better still, by a smoothly-finished floor surface over the concrete foundation slab.

The construction and dimensions of the blow-off pit, the downtake flue, and the main flue will be proportionate to the size of the boiler, and generally in accordance with the particulars given in preceding articles.

For temporary installations, a still more simple and inexpensive mode of setting can be adopted by dispensing with brickwork altogether, as represented in Fig. 41, where the boiler is simply placed on cast-iron cradles. For the conveyance of furnace gases from the fire tubes, a steel plate back flue, or smoke-box, is riveted to the boiler, and at the top of this flue is a steel plate smoke pipe. The back flue should be lined with fireclay bricks or blocks to protect it from flame. The supporting cradles are made of sufficient height to obviate the necessity for a blow-off pit.

If this mode of setting be adopted, care should be taken to provide adequate support for the cradles, as well as a perfectly dry bottom beneath the boiler, which, as in the preceding case, must be properly lagged with non-conducting material.

We now come to a different type of boiler combining the distinctive characteristics of Lancashire and multitubular boilers, in the manner illustrated in Fig. 6, p. 18. Three distinct methods of setting can be adopted for the boiler in question.

(1) The furnace gases may be caused to proceed through the furnace tube, or tubes, to the combustion chamber at the back, thence through the return tubes to the front smoke-box, and along side flues to the main flue.

(2) The furnace gases may proceed through the furnace tube, or tubes, and the return tubes to the front smoke-box, as before, and then divided so that part of the gases passes below the boiler and part along the sides, both streams meeting near the main flue.

(3) The boiler can be installed without brickwork, being provided with a steel plate combustion chamber at the back, lined with firebrick, whence the gases pass through the return tubes to the front smoke-box, and thence into a steel plate chimney at the front of the boiler.

Fig. 42 illustrates the first mode of treatment. The boiler is supported on cast-iron saddles, between which is a low midfeather wall for the purpose of separating the two side flues. The combustion chamber at the back end corresponds, so far as dimensions and construction are concerned, with the downtake flue of an ordinary Lancashire or Cornish boiler. The side walls of the brickwork are built up from the concrete foundation slab, which we assume to have been provided as a preliminary essential. It will be observed that these walls are carried somewhat

higher than in the case of an ordinary Lancashire boiler, this being necessitated by the higher level of the internal heating surface represented by the return tubes. No special features occur in the constructive details of these flues, which are floored, lined, and covered in the manner fully described in preceding articles.

On reference to Fig. 42, it will be noticed that the side flues are sloped down at either side so as to provide conveniently for access to the main flue.

The front cross-wall, the recess wall for blow-off connexion, and the blow-off pit are built and proportioned in general accordance with the particulars previously stated.

Fig. 43 illustrates the second method of setting this class of boiler, which is here shown supported on seating blocks fixed at the top of the walls forming a bottom flue.

The combustion chamber is built of brick with flue covers, substantially as described in connexion with Cornish and Lancashire boilers. The height of this chamber is governed by the level of the uppermost return tubes and its width by the measurements from side to side of the furnace and return tubes.

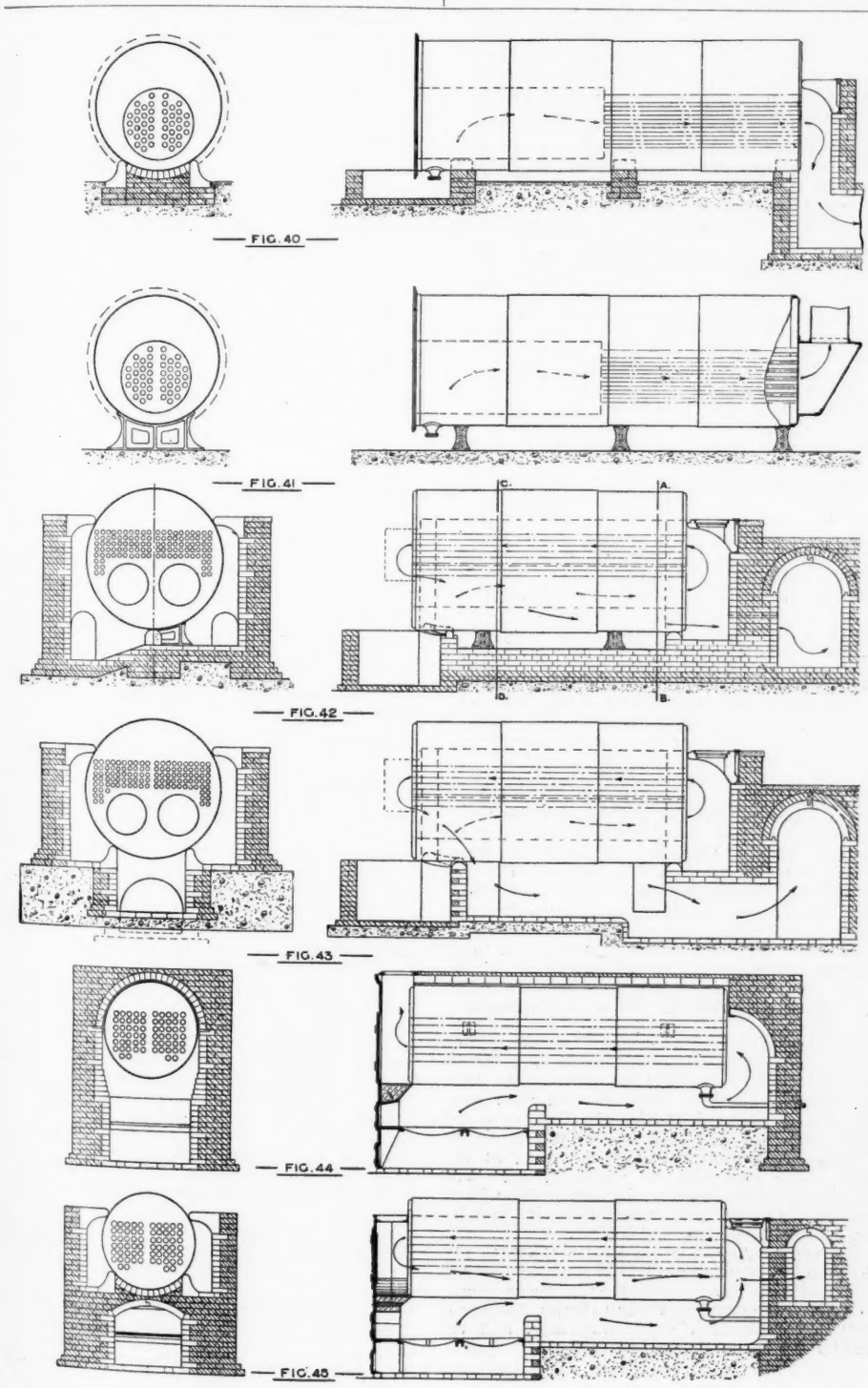
From the back of the front smoke-box, the products of combustion pass to the side and bottom flues. Instead of affording a passage directly to the main flue, as in the setting of an ordinary Lancashire or Cornish boiler,

TABLE XII.—APPROXIMATE DIMENSIONS OF BRICK FURNACES AND FLUES FOR MULTITUBULAR BOILERS (WITHOUT SIDE FLUES).

Diameter of Boiler Shell.	Furnace.			Ashpit. Height at Front Below Grate.	Back Flue. Front to Back.	Smokebox. Front to Back.
	Width at Top.	Width at Bottom.	Height. Grate to Bottom of Boiler.			
ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.
3 0	3 4	3 0	1 6	1 9	1 6	1 0
3 6	3 10	3 6	1 9	2 0	1 6	1 0
4 0	4 4	4 0	1 9	2 0	1 6	1 0
4 6	4 10	4 6	2 0	2 3	1 9	1 3
5 0	5 4	5 0	2 0	2 3	1 9	1 3
5 6	5 10	5 6	2 3	2 6	2 0	1 6
6 0	6 4	6 0	2 3	2 6	2 0	1 6

TABLE XIII.—APPROXIMATE DIMENSIONS OF BRICK FURNACES AND FLUES FOR MULTITUBULAR BOILERS (WITH SIDE FLUES).

Diameter to Boiler Shell.	Furnace.		Back Flue.		Side Flues. Width.	Smokebox. Front to Back.
	Width.	Height.	Width at Top.	Front to Back.		
ft. in.	ft. in.	ft. in.	ft. in.	ft. in	in.	ft. in.
3 0	2 2	1 6	2 3	1 6	6	1 3
3 6	2 6	1 9	2 9	1 6	6	1 3
4 0	2 10	1 9	3 3	1 6	6	1 3
4 6	3 3	2 0	3 9	1 9	9	1 6
5 0	3 7	2 0	4 3	1 9	9	1 6
5 6	3 11	2 3	4 9	1 9	9	1 9
6 0	4 4	2 3	5 3	1 9	9	1 9



Illustrations to Student's Column.

the side flues are stopped at the back end, and each of them has an opening into the hinder part of the bottom flue. The area of the side openings should not be more than one-third that of the main openings into the front end of the bottom flue.

The third method of fixing the type of boiler now under consideration does not require detailed description, as the combustion chamber behind and the chimney in front are supplied as parts of the boiler. Beyond the building of a fireclay lining in the combustion chamber, no brickwork is required.

Marine boilers of the return tube dry-back type are very much akin to boilers of the kind we have just dealt with, and when applied to land service they can be set in the same manner.

We now come to the externally-fired multitubular boiler (see Fig. 4, p. 18). This is a form of steam generator which affords wide scope for the ingenuity of the expert in brickwork.

When the boiler is supplied with a complete iron front, in which are fitted the smokebox doors, the fire door, and the ashpit door, some limit is imposed on the proportions of the furnace and flues, but even then very considerable variations are possible in the design and construction of the brickwork.

Fig. 44 illustrates a method of setting which has been largely followed in this country and in the United States. The boiler is supported by lugs riveted to the shell, two lugs on each side, resting upon the walls. Care must be taken to build the lugs in so that they can move with the expansion and contraction of the boiler, and an inch or two of clearance must be allowed between the inner surface of the side walls and the periphery of the boiler. If these precautions be overlooked, the brickwork will certainly be cracked.

A good plan is to anchor the lugs at one side of the boiler, and to place steel rollers beneath the corresponding lugs at the other side, the rollers acting upon a steel plate built into the wall.

Sometimes the lugs are carried on cast-iron columns embedded in the walls, so that any of the brickwork above the fire-grates can be removed if occasion should demand. Another alternative mode of support is to suspend the boiler by tie-rods built into the upper part of the brickwork and passing around the lugs.

The boiler is completely enclosed by brickwork, which, as shown in the drawing, ought to be kept from actual contact with the plates, as far as possible. In building the arch over the top of the boiler, a good plan is to lay strips of wood of the required thickness upon the boiler and to remove them as the work proceeds.

The arch covering the back flue would be better if turned from side to side, as illustrated in Fig. 26, p. 211, or replaced by fireclay arch blocks, as in Figs. 27 to 29 on the same page.

The whole of the brickwork surrounding the boiler is usually stayed by cast-iron braces connected by tie-bars passing through the masonry from end to end and from side to side.

A preferable system of setting is represented in Fig. 45. In this, the boiler is supported on fireclay seating blocks carried by the side walls of the furnace. The hot gases pass beneath the boiler, through the fire tubes to the front smoke-box, and thence to the side flues, from which they are delivered into a main flue at the back. This method of setting is preferable for various reasons. Better use is made of the heat given out by the fuel, the boiler is free to expand without imposing strains upon the brickwork, and the top is left open save for the usual covering of non-conducting material.

One somewhat troublesome detail in connexion with multitubular boilers, is the division between the furnace and the smoke-box. If formed by a steel plate, as is sometimes the case, it soon burns away, and if built in the form of an inverted arch, the bricks are apt to fall out, or to be damaged by the firing tools. Various types of cast-iron arches have been employed for the purpose of supporting the brickwork, but these are apt to bulge with the heat, and, in practice, satisfactory results will be given by using an inverted arch, forming the bottom of the smoke-box with an arch below forming the furnace entrance, as shown in Fig. 45.

The fire-bridge would be better if built as an inverted arch, serving to key the bricks in, and to render the bridge less liable to damage by the firing tools.

The combustion chamber behind the bridge is built in various ways. Some boiler setters leave it as a deep pit, others make it with a flat floor at about the same level as the fire-bars, and others, again, slope it downwards from the bridge to the back wall. In the ordinary way, however, nothing is to be gained by deviating from the form shown in Fig. 45.

Tables XII. and XIII. contain average dimensions of brick furnaces and flues for multitubular boilers, the measurements being, of course, subject to such modifications as may best suit the requirements of individual cases.

OBITUARY.

MR. WEIR.—Mr. James Weir, of No. 17, Victoria-street, S.W., died, aged sixty years, on August 27, at West Cross, Clapham Common. Mr. Weir was elected an Associate of the Royal Institute of British Architects in 1874, and a Fellow in 1882. He was the architect of Hinde-street Chapel, Marylebone, 1885-6; the new Surrey Chapel and schools in Blackfriars-road, built on the site of the Turkish baths and two houses, 1887-8, for the Primitive Methodist congregation of the old Surrey Chapel (Rowland Hill's) close by, at a cost of nearly 12,000*l.*, the freehold included; the Wesleyan Church, Hayward's Heath, and the chapel at Burgess Hill, Sussex, 1900; the alteration and enlargement of the premises, Nos. 202-6, Camberwell-road, of the Davis Gas Stove Company, at an outlay of nearly 4,000*l.*; and he re-built the Wesleyan church in Norman-road, St. Leonard's-on-Sea, at a cost for the fabric of over 4,500*l.*, after its destruction by fire five years ago. He also prepared the plans and designs of a large two-storied building, adjoining the Wesleyan chapel at Leatherhead, containing classrooms, meeting-rooms, vestry, etc., on the lower floor, and the Wesley Hall on the floor above, with accommodation for 550 people in all; the Wesleyan church, on the summit of the Drive, Sevenoaks, cruciform on plan, with a tower and spire rising to a total height of 80 ft, after the Early English style freely treated, at a total cost of 7,000*l.*, and having a capacity for nearly 600 persons. In January last Mr. Weir took into his practice as partners his then manager, Mr. Frederick Burrows, and his nephew, Mr. William May Weir, under the style of Messrs. Weir, Burrows, & Weir.

MR. MAWSON. — The death at Nasik is announced of Mr. Ernest Oscar Mawson, executive engineer in the Kathiawar Agency, where he constructed extensive irrigation and other preventive works at the time of the famine. Mr. Mawson invented an automatical gate for regulating the escape of stored water in the event of floods, and had published, in association with Mr. Calthrop, a text-book upon "Pioneer Irrigation and Light Railways." He proceeded from Cooper's Hill College in 1888 to India, and rendered distinguished service in the Western Provinces; when Under-Secretary to the Bombay Government he was selected, five years ago, to go to Kathiawar, whence he returned to England upon two years' furlough, invalided by hard work under severe climatic conditions.

GENERAL BUILDING NEWS.

ALL SAINTS', GREAT BERKHAMSTED.—The erection of the first portion of this church has now been commenced; this will consist of four bays of the nave, and two similar bays and apse forming the chancel—both nave and chancel being of the same width, viz., 33 ft. between the piers of arcades—with narrow north and south nave and chancel aisles. It is proposed to build the church wholly of local red bricks with a roof covering of Bedfordshire tiles. The building when completed will have a north transept containing vestries, an organ gallery, a chapel for daily services on the south side, and a western tower, with short, lead-covered spire. The whole of the congregation will be seated in the nave, the aisles being used as passages only. The church will be lighted by double lancet windows in each bay of the clerestory. The church is being built from the designs of Messrs. C. H. Rew and N. A. Rew, architects, of Great Berkhamsted, by the builders, Messrs. J. Honour & Son, of Tring.

ROMAN CATHOLIC CHURCH, ST. HELENS.—At Thatto Heath, St. Helens, on the 21st ult., the foundation-stone was laid of the new church of St. Augustine. The new church is 110 ft. long and 39 ft. wide, and will accommodate about 450 persons. It will be built in the Early English Gothic style, with east end sanctuary and two side chapels, and will be of red stone front, with extended portières. Messrs. Thomas Welsby & Sons are the builders, and Messrs. Curran, of Warrington, the architects. The total cost is estimated at about 2,500*l.*

CATHOLIC CHURCH, GARSTON.—A new Catholic church was opened on the 24th ult. in Garston by Dr. Whiteside. The building has been erected at a cost of a little over 8,000*l.*, and it has been dedicated to St. Francis of Assisi. The church is situate on a south-west corner site, on the east side of Earp-street. It consists of a nave and chancel 102 ft. long and 27 ft. 3 in. wide, transepts 18 ft. across, aisles 11 ft. 6 in. wide, three chapels, priests' and boys' sacristies, confessionals, and an octagonal baptistry at the end of the epistle aisle, and it accommodates 500 people. The style is Gothic, and it is built of red stone, with roofs covered with brindled tiles, and it is lighted by electricity. Mr. D. Powell, of Liverpool, was the architect.

SCALEBY CHURCH.—The Bishop of Carlisle recently re-opened Scaleby Church, the work of restoration which was begun some time ago having been completed. That work, for which Mr. Martindale was the architect and Mr. Sharp, Carlisle, was the contractor, included the re-roofing of the church, the restoration of the tower, the rechanging of the bells, and the repainting of the woodwork of the interior and the recolouring of the walls.

RE-OPENING OF LLANDYRY CHURCH, PEMBREY, CARMARTHENSHIRE.—Llandyry Chapel-of-Ease, in the parish of Pembrey, Carmarthenshire, has just been re-opened after restoration and extension. The old building has been restored, and the nave has beeen extended and a new vestry and organ-chamber built, so that now it has sittings for 200 worshippers. The architect was Mr. W. Griffiths, of Llanelly, and the contractor Mr. Phil Phillips, of Trimsaran.

FIRE STATION, BRADFORD.—On the 22nd ult. the new Bradford branch fire station at Odsal was opened. The station is situated at the junction of roads leading to Bradford, Halifax, Cleckheaton, and Wibsey. It has been designed by Mr. F. E. P. Edwards (City Architect), and in the principal chamber is a steamer as well as a combined chemical engine, tender, and escape. Behind this apartment are the stables, and at the side a watch or duty-room and a recreation-room have been provided. On the second floor there is living accommodation for two officers, and at the rear of the building five cottages have been erected for the firemen, communication being established between these and the watchroom.

CHURCH REBUILDING, GLYNCORRWG.—St. John the Baptist Church, Glyncorrwg, is to be taken down and a new edifice to seat 300 persons is to be erected on the site. The architect is Mr. E. M. Bruce Vaughan, of Cardiff, and the builder Mr. M. Jenkins, Port Talbot. The cost will be about 3,000*l.*

BAPTIST CHAPEL, MAESTEG.—The ceremony of laying the foundation-stones of the new Hope Baptist Chapel, Maesteg, took place on the 14th ult. The building is being erected with local stone; it is treated in the Renaissance style. Accommodation is provided for about 500 people, with a large schoolroom, vestries, etc., at the back. The cost will be about 1,700*l.* The building has been designed by Mr. Beddoe Rees, architect, Cardiff, and is being carried out by Mr. J. Davey, builder, Port Talbot.

SCHOOL OF ART, TAUNTON.—On the 24th ult. the foundation-stone was laid of the new Taunton School of Art. The contract for the work amounts to 4,500*l.*, the architects being Messrs. Samson & Cottam, of Taunton and Bridgwater, and the builder Mr. T. H. Moggridge.

POST-OFFICE, NEWPORT, MON.—The new post-office at Newport is to be erected in the High-street, and the frontage, which will be largely in the Renaissance style, will be about 100 ft. long, as compared with about 35 ft. of the old building. There will be a frontage from the corner of Thomas-street back to the railway platform. The Thomas-street front will be set back a distance of 16 ft. from the rear of the footpath, and the space will be occupied by a covered loading platform, so that vehicles may be drawn up there and loaded without obstruction to the traffic in the street. The main front in High-street will be built of Portland stone, with Ruabon brick panels. At the top there will be a projecting medallion cornice of over 3 ft., and above it a parapet with open balustrading. The windows of the second floor will have ornamental pediments. At the main entrance there will be double doors of teak, with panels and lead glazing on either side. In the basement there will be accommodation for pneumatic power, power-rooms, linesmen's-rooms, engineers' storerooms, and accommodation for messenger boys. The ground floor will be devoted to the public office (which will have a capacity of 1,300 to 1,400 sq. ft.), accountant's-room, sorting-room (94 ft. by 56 ft.), and store places. On the first floor there will be rooms for the postmaster, surveyor, chief clerk, the writing staff, engineer, dining-room for the general staff (32 ft. by 40 ft.), and kitchen, with larder. On the second floor will be the telephone-room and instrument-room, with testing-rooms for telephone and telegraph wires. The third floor will be devoted to battery-rooms and change-over switchrooms, with store and workrooms for the engineering staff. The work is being superintended by Mr. Pickett (clerk of the works).

WORKHOUSE INFIRMARY, OTLEY.—The new Workhouse Infirmary at Otley, which is to be constructed of Guiseley stone, is to cost 8,571*l.*, and is to give accommodation for seventy patients. The new building is to be in three sections or blocks, the two end ones being for men and women respectively, and the centre for the nurses and attendants. In each of the former two there are to be two wards, each to contain sixteen beds, and there are separate wards for isolation, or special, cases. On the men's side there are three of these private wards, two of which will hold two beds and the other one bed, whilst on the other there is to be one ward, a lying-in room, and a labour-room. The nurses' quarters will be conveniently placed. On the ground floor are to be rooms for the doctor and the head nurse, a large dining-room, scullery, etc., whilst upstairs are five bedrooms, bathroom, and linen closet. A glass corridor connects the three buildings, the site of which is to the west of the workhouse, and in close proximity thereto. The woodwork in the interior is to be of pitch pine. Mr. W. H. Herbert Marten, of Bradford and Menston, is the architect.

VICARAGE, OXFORD.—The foundation-stone of St. Paul's Vicarage, Oxford, was laid on the 16th ult. by the Bishop of Reading. The cost of the work, which will be carried out in red brick, is estimated at about 1,500*l.* Mr. Eden, of London, is the architect.

HOSPITAL, PENISTONE, YORKSHIRE.—A new hospital has just been opened in Penistone. The buildings comprise four blocks, built of Shepley and Thurlstone stone. The lighting is by acetylene gas, made on the premises, and a dual drainage system has been introduced. The work has been carried out, under the superintendence of Mr. G. A. Wilde, Sheffield, by Messrs. Allott, Cook, & Heywood, contractors, Cumberworth; with Messrs. John Holmes & Sons, Denby Dale, joiners; Mr. Fleming, Barnsley, slater; Mr. A. Wilkinson, Ossett, plasterer; and Mr. Frank Tinker, Penistone, plumber, glazier, painter, and gasfitter. The wood-block flooring has been laid by Messrs. E. B. Burgess & Co., Liverpool.

WORKHOUSE INFIRMARY, WHARFEDALE.—On the 19th ult. the foundation-stone of the new Wharfedale Workhouse Infirmary was laid at Otley. The building, which is being erected by Mr. J. Hannam, contractor, from designs by Mr. W. H. Herbert Marten, architect, of Bradford, is estimated to cost about 8,000*l.*

SANATORIUM AT ALLTYMYNYDD.—A meeting of the general committee of the West Wales Branch of the National Society for the Prevention of Consumption and Other Forms of Tuberculosis was held at the Guildhall, Carmarthen, recently, when plans of a permanent sanatorium building of concrete, to be erected at Alltymynydd, were presented by Mr. Ernest Collier, architect, Carmarthen. The building is to accommodate twenty beds for poor patients and eight beds for paying patients. It was decided to refer the plans for final adoption to the Building and Sites Committee, and to advertise for and accept tenders, with the view to an immediate expenditure not exceeding 5,000*l.* Tenders will be asked for the main block and for the annexes for paying patients separately.

MEMORIAL LIBRARY, GLENALMOND.—The new library which has been erected in connexion with Trinity College, Glenalmond, as a memorial to those who fell in the South African war, has just been opened. The building consists of an entrance-hall and two classrooms on the ground

floor and of a library on the first floor. It has been built of similar materials to those used in the old building. Stone has been obtained within the college grounds, and the local Craiglea slates were used on the roof. The entrance-hall has a stone-flagged floor, the walls are lined internally with masonry, and the ceiling has wooden beams with plaster panels. The classrooms have steam heating and electric light. The library, approached by a winding stone staircase with carved stone newel and oak handrails, measures 57 ft. long by 22 ft. wide and 18 ft. high. The contractors for the work are:—Mr. Robert M'Ritchie, builder, Crieff; Mr. Wm. M'Quibban, joiner, Perth; Mr. Alexander Eadie, slater, Methven; Messrs. A. M'Ritchie & Son, plasterers, Dundee; Messrs. G. R. Douglas & Sons, glaziers, Perth. Mr. A. G. Heiton, Perth, is the architect.

MODEL LODGING HOUSE, CONSETT.—The old Theatre Royal in Trafalgar-street, Consett, is at present being converted into a model lodging-house. The designs have been prepared by Mr. George T. Wilson, architect, Blackhill; and Mr. W. F. Smith, of Consett, is carrying out the alterations. The premises will be heated by hot water, and baths, lavatories, etc., will be provided.

MEMORIAL CHAPEL, STARKHOLMES, MATLOCK.—The new Fox memorial chapel of the Primitive Methodist Connexion at Starkholmes was opened recently. The chapel, designed by Mr. D. M. Wildgoose, is in the Gothic style, and is built of local gritstone by Mr. J. W. Wildgoose, the contractor. The cost has been about 1,400*l.*

FIRE STATION, FOWEY.—A new fire station has been erected and opened at Fowey. It was built of Exmouth brick, faced with dressings of Candy buff terra-cotta brick. The roof is of slate; it is a two-story building, having concrete floors. The building is 16 ft. by 20 ft., and the upper room is match-boarded on the inside, whilst the entrance has a elliptic arch, with sliding doors. There is accommodation for drying the hose, gas fittings have been installed, and there is the usual washyard with necessary conveniences etc. Mr. H. Billing is the contractor and Mr. T. H. Northcote the architect.

APPOINTMENTS.

INDIA.—Mr. Malcolm Little, A.M.Inst.C.E., of Leeds, has received an appointment under the Indian Government in the Public Works Department, and will leave the city shortly to take up his new position. Mr. Little is at present engaged as resident engineer in connexion with the Leeds Corporation Waterworks at Kettlesing.

DERBY.—Mr. Harry Holmes, A.M.Inst.M.E., M.R.S.I., M.S.E., engineer to Messrs. Aston W. Smith & Son, contractors for the Derby sewerage scheme, has been appointed, out of 185 applicants, resident engineer to the Town Council of the county borough of Croydon.

ART MUSEUM, SOUTH KENSINGTON.—The directorship of the Art Museum, recently resigned by Sir Caspar Purdon Clarke on his appointment to the Museum in New York, has been conferred upon Mr. Arthur Banks Skinner, who joined the staff of the Museum in 1879, and was appointed assistant-director of the Art Museum in 1896.

ROYAL SCHOOL OF MINES.—The President of the Board of Education has nominated Mr. S. Herbert Cox to the Professorship of Mining at the Royal School of Mines, South Kensington, *vice* the late Sir Clement le Neve Foster, but in view of changes which may be found desirable of the organisation of the Royal College of Science and the Royal School of Mines, the appointment is subject to revision hereafter. Mr. Cox, a past-President of the Institution of Mining and Metallurgy, has been employed in many countries during the past fifteen years, having formerly been Inspector of Mines in New South Wales and New Zealand.

SANITARY AND ENGINEERING NEWS.

PROTECTING LIVERPOOL'S WATER SUPPLY.—With a view to protecting their water supply from pollution, the Liverpool Corporation have decided to cover, for a distance of 1,100 yards, the water course connecting their Roddlesworth and Anglezarke reservoirs in the Rivington watershed. This particular stream passes through a populous village at Withnell, and its contiguity to the dwelling houses has hitherto rendered it liable to be contaminated. A start has just been made in the work, and besides tunnelling the goit, the bed of the stream is to be concreted. The contract has been let to a Manchester firm, and the scheme is estimated to cost 10,000*l.*

SEWERAGE WORKS, HENDON, N.W.—A Local Government inquiry was held here on the 30th ult. by Mr. R. H. Bicknell, M.Inst.C.E., Inspector, into the application of the Urban District Council for sanction to a loan of 22,591*l.* for works of sewerage, sewage disposal, and certain road works. The proposed works comprise over 4 miles of sewers and storm water drainage in the Regent's Park-road and Edgeware-road, varying in size from 9 in. to 21 in. in diameter, with the usual manholes at every change of direction and gradient. Also for the extension of the bacteria beds at the outfall works by an area of 3,200 yards superficial of washed clinker breeze filters, and for an additional area of 13½ acres of land, bringing up the area of the outfall works to over 70 acres. The district is rapidly developing—the dry weather flow of sewage being over 1,000,000 gallons per day, from a population of some 25,000. Mr. S. Slater Grimley, A.M.Inst.C.E., the Engineer to the Council, explained the details of the scheme, and there was no opposition. The Thames Conservancy were represented by Mr. A. J. K. Drummond, Chief Inspector, and Mr. Hampton.

FOREIGN.

GERMANY.—A memorial of Bismarck is being executed for Hamburg. The figure is to be 15 mètres high and will grasp a sword 8 mètres long; it will be composed of nearly 100 blocks of granite, and will be supported on either side by an eagle. The memorial, it is hoped, will be completed in the spring, so that it can be unveiled on Bismarck's ninety-first birthday on April 1st, 1906.——An International Exhibition of Arts is to be held at Mannheim in 1907, at which painting, sculpture, black and white drawing and various decorative arts will be represented.——An exhibition of the Industrial Arts is to be held at Dresden from May to October, 1906.——The tower of the church at Danzig, which was destroyed by lightning, is to be restored.

SWITZERLAND.—A new museum is to be built at Lucerne from plans by the architect, Herr Meili-Wapf, at a cost of about 950,000 francs.——New schools are to be built at Rheineck from plans by the architect, Herr Gaudy, at a cost of 200,000 francs.

MISCELLANEOUS.

THE RENOVATION OF LEEDS DISTRICTS.—The Unhealthy Areas Committee of the Leeds Corporation met on the 17th ult., and had under consideration their report for the year ending with March 25 last. In the York-street area forty buildings were demolished during the twelve months, including two public-houses, making the total number so dealt with in this area 391 houses, including six public-houses. The demolition of these forty houses has nominally displaced ninety-one persons of the labouring class, the total number so displaced in the York-street area now amounting to 1,403. During March, 1905, there were forty-nine empty houses available for habitation. Notices of intention to take have been given for a further sixty houses, mostly situate between Brick-street, Brussels-street, and Marsh-lane. Of these sixty houses, at present there are only some thirteen tenanted. Although, therefore, there were 219 persons of the labouring class inhabiting these houses according to the figures supplied to the Local Government Board at the time of obtaining the order, the actual number disturbed will only be forty-six. Contracts have been signed for the construction of the Quarry Hill improvement, and the Committee are waiting for the Local Government Board to grant the borrowing powers, prior to commencing the work. The alterations here include the formation of a street, 75 ft. wide, from Mabgate to the junction of Burmantofts-street and York-road, the gradients of which will in no case be steeper than one in 33·5. The contract also provides for the construction of subways under the causeways, so that on completion it is hoped that the surface of the paving will never have to be disturbed. These works necessitate the demolition of a further 279 houses, nominally accommodating 928 persons of the labouring class, but at present many of the houses are empty. In regard to the West-street district, the Committee refer to an arrangement that has been entered into between the Corporation and the Trustees of Wade's Charity, whereby, on the contribution by the Corporation of two annual instalments of 2,500*l.*, the trustees undertake to acquire for demolition one of the worst slums in the West-street district, after which the space will be kept open and unbuilt upon for ever. This will ventilate a number of the adjoining streets, and will make a great improvement in the heart of the West-street area. In the Bank district thirteen houses have been demolished during the year, and the sites either paved or flagged, and the works have materially improved the courts known as Giles-square and Allison's-court. The habitable houses now to let in the districts where improvements have been carried out number 565, as compared with 366 a year previously. The net cost of the improvements to the rates for the twelve months was 25,269*l.* 11s. 5d.

RUSSIAN TIMBER TRADE.—A consular report states that the total quantity of timber exported from Odessa in 1904 was 161,543 tons, against 167,666 tons in 1903. Of this amount 41,380 tons went to the Netherlands, 47,137 tons to Egypt, 33,108 tons to Turkey, and 10,151 tons to the United Kingdom, while France and Belgium were customers to the extent of about 11,000 tons each.—Describing the trade and commerce of the Riga district for 1904, Mr. Consul Woodhouse writes that the sawn goods trade in 1904 was unremunerative to sellers. Prices started to recede at the very commencement of the selling season, and steadily continued to do so until the autumn, when, in whitewood at least, a slight reaction set in, but in redwood they never recovered. The average reduction in price amounted to nearly 1*l.* per standard, which on Riga production means about 17 per cent. It was the old story of production and demand failing to keep step. The forests which supply the timber prepared in the winter of 1903 a stock for the season of 1904 which was based upon the prospects of an increased demand, but by the time the fresh supplies from the forests reached the mills the demand had decreased considerably, hence the fall in prices. The supply of rafts from the forests in 1904 amounted to 17,300 rafts, against 13,700 rafts in 1903, an increase of more than 25 per cent. The average annual number of rafts arriving at Riga is 15,000, so that the supply for 1904 was about 15 per cent. above the average. During the winter 1904-5 forest operations in the Riga district were considerably curtailed; the supply of rafts for 1905 will probably be not more than 9,000 to 10,000 rafts, say, 40 per cent. less than last year's quantity.

PADDINGTON TOWN HALL.—Upon a tender of 12,342*l.* made by Mr. Nightingale the work has been begun for an extension of the town hall, Paddington-green, to include the enlargement and improvement of the council-chamber and additional office accommodation, upon ground at the rear of the present building.

THE ROMAN STATION AT NEWSTEAD.—Several members of the Hawick Archæological Society paid a visit on the 25th ult. to the excavations which are being carried out at Newstead in connexion with the ancient Roman station. They were met by Mr. Curle, Priorwood, who, acting as guide, said the earliest record they had of finds there was one in the end of the XVIIIth and another in the beginning of the XIXth centuries. Then in 1840, when the railway was cut through there, they came across Roman remains, and Dr. John Dickon Smith, who was a keen antiquarian in these days, made some notes, which appeared in the Proceedings of the Society of Antiquaries. From that time onwards he did not think there was any record of finds, although odd things were now and again picked up by the tenants. About a year ago Mr. Roberts was draining in the fields, and, watching the drains, he (Mr. Curle) and his brother saw traces of undoubted Roman remains, and ultimately the Society of Antiquaries decided to take the matter up. One of those fields had always been known as the Well Meadow, and he always hoped they would find the well. Mr. Curle proceeded to describe in detail the progress that had been made with the excavations, mentioning that the camp occupied about fourteen acres, which must be two or three times the size of any other camp touched so far. In the field in which they were now working—the Well Meadow being at present under crop—they had traced four large buildings belonging to the camp, and they had gathered that there had been two occupations of the place, both Roman. They had found a good many coins, a great deal of pottery, and some pieces of enamel of considerable interest, and also a Roman stylus. Mr. Curle's description was followed with great interest, and before leaving, Professor Cooper, in calling for a vote of thanks to Mr. Curle, said it was quite obvious that there they had one of the most important Roman stations in the land, and certainly the largest and most important in North Britain. He hoped the necessary funds would be provided to carry on these excavations.—The *Scotsman*.

PRESERVATION OF TIMBER.—Mr. Vice-Consul Carmichael writes from Leghorn to the British Foreign Office that a syndicate of Genoese and Livornese capitalists has been formed for working the Rueping patent—a process by which wood (especially sleepers and beams) is impregnated so as to preserve it from decay. The society also proposes to deal in timber of all kinds, and their yards will be fitted up with the latest machinery in the suburb of Torretta. The amount of the capital has not yet been made public.

ADVANCED INSTRUCTION FOR PLUMBERS.—A part of the course of advanced instruction for plumbers given by the Plumbers' Company at King's College, London, includes visits to notable buildings where plumbing and sanitary work is in progress. A party of students attending this course recently visited the workmen's dwellings at Grove End-road, St. John's-wood, where the foreman in charge explained the character of the work, pointing out the various specialities in connexion with the same, notably the special stoneware interceptors with sweeping eyes, special expansion joints, locking apparatus for gullies, etc. In this work there are nearly 1,000 fittings, water-closets, sinks, baths, and lavatories, and nearly 200 stacks of pipes. The soil and waste pipes are fitted with special inspection caps at each change of direction, and on each junction. The details of the drainage were explained to the students and a section of the drains tested by hydraulic pressure to prove their soundness.

The whole of the contract has been executed by Messrs. Davis & Bennett, of Westminster, and registered plumbers were employed throughout the work.

PATENTS OF THE WEEK.

APPLICATIONS PUBLISHED.*

17,062 of 1904.—T. ARROWSMITH, T. H. ARROWSMITH, and J. ARROWSMITH: *Appliances for Use in Forming Undercut Recesses in Bricks, Quarries, Tiles, and other Articles.*

THIS relates to the fitting of suitably-shaped metallic die blocks, and consists in the combination of a die box, guides, lifting and depressing rods, transverse bars, springs, and a bearing block, with slidable push bars, and rods or levers for operating same, with presses or like machines for use in making "stacks," bricks, tiles, and other articles from semi-plastic clay, or like material, with undercut recesses in one side surface of same, and the use of a metallic or wood frame for lifting the formed article from off the serrated end of the matrix or lower portion of the die block.

18,928 of 1904.—THE KOMATA REEFS GOLD MINING COMPANY, LTD. (F. C. BROWN): *Apparatus for Mixing or Circulating Materials in a Liquid or Semi-Liquid State.*

An apparatus for circulating and mixing crushed ores in a liquid or semi-liquid state, consisting in the combination of a tank adapted to receive the material to be treated, a material-conducting pipe suspended therein, means for introducing liquid into the tank near the bottom thereof to bring the material to a fluid state, means for distributing and discharging the liquid, and means for supplying air to the lower portion of the tank for forcing the material up through and out of said pipe, causing thereby the circulation, agitation, and mixing of the material within the tank.

19,528 of 1904.—J. PETERS and A. RILEY: *Bond Iron or Tie for Walls.*

According to the invention the tie is formed in two parts, each part being capable of being built into the wall, and also of engaging with the other part by a suitable connecting device or connecting devices. A connecting device on one part of the bond iron is passed through the sheet of metal forming the vertical damp proof course, and the connecting device on the other part of the bond is caused to engage with the device on the first in such a manner that the two parts are firmly joined together, and the damp proof course material is firmly gripped and held between them in such a manner that damp or moisture cannot pass through the opening from one side of the damp proof course to the other.

20,041 of 1904.—R. T. HODGSON: *Fireplaces.*

This relates to a grate made of cast iron or other suitable material and provided at the rear with projections or studs which act as pivots for the grate to tilt on when placed in position. The front of the said grate is raised or curved, so as to be approximately semi-circular in section. This part is slotted at intervals so as to form air spaces, and co-acting therewith is a slide similarly slotted, and adapted to act either longitudinally or concentrically. These parts work on the hit and miss principle, and form a ventilator for the grate.

20,385 of 1904.—S. PHILLIPS: *Firegrates.*

This invention consists of a firegrate having a sliding removable bottom, to the under back end of which is connected, by means of suitable supports, a sweeping brush, which may be a revolving or a fixed brush. Suitable side plates and front bars are provided, constituting the main portion of the firegrate, such main portion being a fixture in the fireplace. One or more of the lower bars in the fixed part of the firegrate are dispensed with, and the removable sliding bottom is formed as a grid of any configuration suitable to permit of ashes falling through. At the front end of this grid, as part thereof, the front lower bar or several bars of the grate are provided, and at the rear end of the grate suitable supports are provided to which are connected the stationary or the revolving brush. The combined grid and its bar or bars and brush connexions are removable in one piece.

21,087 of 1904.—J. W. CROOK: *Fire Plugs and Stand Pipes.*

A stand pipe adapted to be fitted to fire plugs, and to occupy a lower level than that of the street, and constructed with a coupling-head, and provided with fittings, consisting of a flange at its bottom edge and union and an internal jointing ring.

25,437 of 1904.—R. EWING: *Joints of Stoneware and other Pipes.*

A pipe joint consisting in the combination of a bell-shaped socket with an inner wall about half the length of the outer wall, with a spigot having at its extremity—moulded on, of any suitable composition—an overlapping collar or faucet or saddle, receiving the end of said inner wall of socket, and with the saddle at the mouth of socket attached to or forming a part of either spigot or socket.

29,221 of 1904.—G. W. LUPSON: *Building Blocks.*

A moulded block having cavities running through vertically, whereby, when the blocks are placed in position, the cavities coming exactly over each other, form vertical air shafts, which may be used for ventilating the structure or may be filled with concrete or other suitable material if a solid wall is desired.

2,560 of 1905.—J. SCHERRA: *Construction of Walls and Partitions for Fireproof Buildings.*

This relates to the construction of walls for fireproof buildings wherein recessed studding members are used, and are provided with sliding members adapted to be attached to the floors, and consists in adapting the sheet metal, forming the sliding member, to bridge the recessed portions of the studding member, and to be tightened thereon by bending inwardly.

3,084 of 1905.—J. B. MOYET and H. BOUVIER: *Portable Apparatus for Lifting, Lowering, and Shifting Loads.*

Apparatus for lifting, lowering, and shifting loads, consisting in the combination with an unequal-armed lever capable of turning in a horizontal plane and moving up and down in vertical planes, and provided on the larger arm with a counterweight adjustable along this arm by means of chain gear, of a standard having feet bearing on the ground when the apparatus is in use, wheels journalled eccentrically on a shaft carried by two of the said feet, a wheel at the end of the longer lever arm capable of being brought into contact with the ground when the said longer arm is tilted downwards, a rod for connecting the end of said longer arm to the shaft so that the shaft is thereby rotated to cause the wheels carried thereon to come into contact with the ground and to raise the feet of the standard from the ground, thereby enabling the apparatus to be wheeled from one place to another.

6,583 of 1905.—G. H. THIRSK: *Art of Constructing Chimneys or Stacks.*

This relates to the art of constructing chimneys or stacks of angular formation, and consists in using angular bricks of gradually decreasing size to form the corners and produce tapering thereof, and rectangular bricks to form the sides, such angular and rectangular bricks being arranged in courses adapted to provide a true bond throughout the structure.

20,226 of 1904.—J. LOCKIE: *A Self-opening Lifting Device Adapted to Release Bags of Cement when placed in position for Pier Building, or like purposes.*

This invention relates to a self-opening lifting device adapted to release bags of cement when placed in position for pier building. According to the invention, a clutch is provided with hooks which are inserted into the bag of cement, the bag being lifted thereby. As soon as the weight is taken off the hooks by the bag of cement being at rest, the clutch is automatically released.

21,703 of 1904.—J. HALL and R. B. WRAGG: *Device for Feeding Clay to Sanitary Pipe Machines.*

According to the invention, a plate or the like is employed situated opposite the mouth of the machines, and connected at the ends to one or more sliding rods, preferably on two rods, one passing on either side of the machine. These rods are supported slidably in bearings attached, for example, to the body of the machines, or they may be supported by swinging links attached to any convenient part. They are caused to reciprocate together by means of cranks, cams, or the like, attached to a shaft which may be driven by belt or other gearing from the power shaft driving the machines.

6,668 of 1905.—C. JACCKEL: *Drain Conduits.*

A drain conduit comprising an outer and an inner member, the outer member being open at its bottom and the inner member being open at its top, there also being a passage leading from the open bottom of the outer member to the open top of the inner member, and said inner member constituting a trough or gutter.

18,924 of 1904.—A. E. HUBERT and W. EDWARDS: *Automatic or Intermittent Flushing Tank for Drains, Sewers, and the like.*

This relates to flushing tanks for drains, and consists in the combination of a syphon pipe with trap below same, and a lifting dome acted upon by the pivoted levers and floats, by which action the air compressed in the pipe constantly expands to its normal state, allowing the different levels of water inside and outside the dome to assume the same levels, whereby the pipe is filled with water which at once sets up syphonic action.

19,288 of 1904.—A. J. SMITH: *Street Gulley Boxes, Sinks, or Traps.*

A gulley trap wherein a flap or door is provided adapted to tend to close the opening leading from the space beyond the water-seal to the outflow chamber, whilst the said chamber is closed in a gas-tight manner in order to prevent the back flow of water or escape of sewer gases through the trap when the flap is closed on its seating. The cover of the chamber which communicates with the drain is adapted to be locked by tail-pieces projecting from said cover and from the rear of a grid, whilst said grid is locked by suitable means, such as a gravity catch.

19,489 of 1904.—H. WILHELM: *Covers for Manholes, Shafts, and the like.*

This relates to manhole, shaft, and similar covers, and consists in the combination of a cover-plate, a slot in said cover-plate, inclined lateral and end faces for said slot, a pivoted closing member for said slot, inclined lateral and end faces for said closing member corresponding to the lateral and end faces of said slot, a handle connected on the normal underside of said closing member, said handle being of segmental form, and a stop carried at the extremity of said handle for engagement with the underside of said cover.

5,323 of 1905.—H. ALEXANDER: *Outflow Connexion for Cisterns.*

This relates to apparatus so arranged as to facilitate the cleansing of iron or other domestic cisterns by the use of an outlet arranged for hand movement, and connected with the down surface of such cistern. The action is as follows:—The upper end of the outlet—which, like the upper end of an ordinary fixed outlet, is 2 in. or more above the bottom—effectually precludes the ordinary deposits which accrue in open cisterns from passing down, and polluting the surface, and when the removal of deposits and cleansing becomes necessary, the outlet, which may be secured by a chain attached to an eye in a segment of a flange, can be taken out of its socketing, and the whole contents, deposits and water, be swept away from the surface of the bottom, with no trouble, through the open passages between the segment of the boss flange.

20,911 of 1904.—R. DUNCAN: *Hob Grates.*

The invention comprises a sitting-room hob grate having an oven constructed some distance above the hobs and fire space which is heated by the fire beneath through a flue which passes under the hob, behind the side cove plate underneath, above, and behind the oven, where it unites with the chimney. Hooks are combined with the front parts of this oven for the purpose of attaching a screen of upholstery to hide the oven doors when cooking is not required.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

Legal.

SOUTH NORWOOD NUISANCE CASE.

THE case of Saunders *v.* Lovell came before Mr. Justice A. J. Lawrence, sitting as Vacation Judge, on the 30th ult., on a motion by the plaintiff, the owner of three houses in Oakley-road, South Norwood, for an *interim* injunction to restrain the defendant, an experimental engineer, who carried on his business in a shed adjoining the wall of No. 2, Oakley-road, until the trial or further order from working his engine, drilling machines, and lathes so as to cause a nuisance by noise and vibration to the plaintiff's tenants. Affidavits sworn by the plaintiff and his tenants in support of the motion having been read,

Counsel for the defendant stated that he had a number of affidavits sworn by experts entirely contradicting the plaintiff's allegations. There was, he said, certainly some vibration from the engine, but it was not such that anybody could complain of.

In the result, the motion was ordered to stand till the trial of the action, the plaintiff to have liberty to apply to expedite the trial. The defendant undertook not to work the engine on Sundays, or after 9 p.m. on week-days, or to run the engine so as to be a nuisance to the plaintiff's tenants.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

August 9. — By HAMPTON & SONS (at Bideford).	
Monkleigh, Devon.—Looseham and Upcott	
Farm, 173 a. 3 r. 8 p., f.	£4,500
Knowle Farm, 87 a. 1 r. 14 p., f.	1,500
Ley Farm, 135 a. 0 r. 4 p., f.	3,000
"The Bell Inn," f., y.r. 16*l.* 10s.	500
Post office, house, etc., f., y.r. 7*l.*	210
August 15.—By BALLARD & MARSH (at Twickenham).	
Twickenham. — "Devonshire House," Fifth	
Cross-rd., c., e.r. 35*l.*	420
1 and 2, Concrete-villas, f., w.r. 54*l.* 12s.	440
August 16. — By MADDISON, MILES, & MADDISON (at Harleston).	
Fressingfield, Suffolk.—Small holding, 5 a.	
0 r. 21 p., f.	150
Church-st., four freehold cottages	140

August 19. — By H. DUKE & SON (at Dorchester).

Beaminster, Dorset.—West Axnoller Estate, 213 a., f.	£4,675

By HUMBERT & FLINT (at Southend).

Southend, Essex.—6 and 8, Leigh-rd., (s.), f., y.r. 100*l.*	1,685

August 21.—By THORNBORROW & CO (at Bolton).

Bolton, Westmorland.—Lane End, house and enclosures, 21 a. 3 r. 37 p., f. and c.	642
King's Meaburn, Westmorland. — Dwelling house and enclosures, 8 a. 3 r. 30 p., c.	412

August 23. — By WILLOUGHBY, SON, & CALLOW.

Woolwich.—Nightingale-vale, f.g. rent 21*l.*, reversion in 47 yrs.	450

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. for beerhouse; p.h. for public-house; o. for offices; s. for shops; ct. for court.

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We are compelled to decline pointing out books and giving addresses.

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All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

MEETING.

WEDNESDAY, SEPTEMBER 6.

Institute of Sanitary Engineers, Ltd.—Election Committee at 3.30 p.m. Organising Committee at 5 p.m.

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PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£	s.	d.			
Hard Stocks	1	8	0	per 1000	alongside, in river.	
Rough Stocks and Grizzles	1	4	0	,,	,,	,,
Facing Stocks	2	0	0	,,	,,	,,
Shippers	2	0	0	,,	,,	,,
Flettons	1	7	0	,,	at railway depôt.	
Red Wire Cuts	1	14	0	,,	,,	,,
Best Fareham Red	3	12	0	,,	,,	,,
Best Red Pressed Ruabon Facing	5	0	0	,,	,,	,,
Best Blue Pressed Staffordshire	4	2	6	,,	,,	,,
Do. Bullnose	4	7	6	,,	,,	,,
Best Stourbridge Fire Bricks	4	0	0	,,	,,	,,
GLAZED BRICKS.						
Best White and Ivory Glazed Stretchers	12	0	0	,,	,,	,,
Headers	11	0	0	,,	,,	,,
Quoins, Bullnose, and Flats	16	0	0	,,	,,	,,
Double Stretchers	19	0	0	,,	,,	,,
Double Headers	16	0	0	,,	,,	,,
One Side and two Ends	19	0	0	,,	,,	,,
Two Sides and one End	20	0	0	,,	,,	,,
Splays, Chamferred, Squints	20	0	0	,,	,,	,,
Best Dipped Salt Glazed Stretchers, and Header	12	0	0	,,	,,	,,

BRICKS, &c. (*continued*).

	£	s.	d.			
Quoins, Bullnose, and Flats	14	0	0	per 1000	at railway depôt.	
Double Stretchers	15	0	0	,,	,,	,,
Double Headers	14	0	0	,,	,,	,,
One Side and two Ends	15	0	0	,,	,,	,,
Two Sides and one End	15	0	0	,,	,,	,,
Splays, Chamferred, Squints	14	0	0	,,	,,	,,
Second Quality White and Dipped Salt Glazed	2	0	0	,,	less than best.	

	s.	d.	
Thames and Pit Sand	7	0	per yard, delivered.
Thames Ballast	5	9	,, ,,
Best Portland Cement	27	0	per ton, ,,
Best Ground Blue Lias Lime	20	0	,, ,,

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime.....12s. 0d. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dp'.

STONE.

	s.	d.	
BATH STONE—delivered on road waggons, Paddington Depôt	1	6½	per ft. cube.
Do. do. delivered on road waggons, Nine Elms Depôt	1	8¼	,, ,,
PORTLAND STONE (20 ft. average)—Brown Whitbed, delivered on road waggons, Paddington depôt, Nine Elms depôt, or Pimlico Wharf	2	1	,, ,,
White Basebed, delivered on road waggons, Paddington depôt, Nine Elms depôt, or Pimlico Wharf	2	2½	,, ,,

	s.	d.		
Ancaster in blocks	1	11	per ft. cube, deld. rly. depôt.	
Beer ,,	1	6	,,	,,
Greenshill ,,	1	10	,,	,,
Darley Dale in blocks	2	4	,,	,,
Red Corsehill ,,	2	2		,,
CloseburnRedFreestone	2	0	,,	,,
Red Mansfield ,,	2	4	,,	,,
YORK STONE—*Robin Hood Quality.*				
Scappled random blocks	2	10	,,	,,
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2	3	per ft. super.	,,
6 in. rubbed two sides ditto, ditto	2	6	,,	,,
3 in. sawn two sides slabs (random sizes)	0	11½	,,	,,
2 in. to 2½ in. sawn one side slabs (random sizes)	0	7¼	,,	,,
1½ in. to 2 in. ditto, ditto	0	6	,,	,,
HARD YORK—				
Scappled random blocks	3	0	per ft. cube.	,,
6 in. sawn two sides, landings to sizes (under 40 ft. super.)	2	8	per ft. super.	,,
6 in. rubbed two sides ditto	3	0	,,	,,
3 in. sawn two sides (slabs random sizes)	1	2	,,	,,
2 in. self-faced random flags	0	5	,,	,,

	s.	d.		
Hopton Wood (Hard Bed) in blocks	2	0	per ft. cube. deld. rly. depôt.	
,, ,, ,, 6 in. sawn both sides landings	2	7	per ft. super. deld. rly. depôt.	
,, ,, ,, 3 in. sawn both sides random slabs	1	0	,,	,,
,, ,, ,, 2 in. do.	0	8½	,,	,,

SLATES.

in.	in.	£	s.	d.		
20 × 10 best blue Bangor		13	2	6	per 1000 of 1200 at r.	d.
20 × 12	,, ,,	13	17	6	,,	,,
20 × 10 first quality	,,	13	0	0	,,	,,
20 × 12	,, ,, ,,	13	15	0	,,	,,
16 × 8	,, ,, ,,	7	5	0	,,	,,
20 × 10 best blue Portmadoc		12	12	6	,,	,,
16 × 8	,, ,,	6	12	6	,,	,,
20 × 10 best Eureka unfading green		15	17	6	,,	,,
20 × 12	,, ,,	18	7	6	,,	,,
18 × 10	,, ,,	13	5	0	,,	,,
16 × 8	,, ,,	10	5	0	,,	,,
20 × 10 permanent green		11	12	6	,,	,,
18 × 10	,, ,,	9	12	6	,,	,,
16 × 8	,, ,,	6	12	6	,,	,,

TILES.

	s.	d.	
Best plain red roofing tiles	42	0	per 1000 at rly. depôt.
Hip and Valley tiles	3	7	per doz. ,, ,,
Best Brosely tiles	50	0	per 1000 ,, ,,
Do. Ornamental tiles	52	6	,, ,,
Hip and Valley tiles	4	0	per doz. ,, ,,
Best Ruabon red, brown, or brindled do. (Edwards)	57	6	per 1000 ,, ,,
Do. Ornamental do	60	0	,, ,, ,,
Hip tiles	4	0	per doz. ,, ,,
Valley tiles	3	0	,, ,, ,,
Best Red or Mottled Staffordshire do. (Peakes)	51	9	per 1000 ,, ,,
Do. Ornamental do	54	6	,, ,, ,,
Hip tiles	4	1	per doz. ,, ,,
Valley tiles	3	8	,, ,, ,,
Best "Rosemary" brand plain tiles	48	0	per 1000 ,, ,,
Best Ornamental tiles	50	0	,, ,, ,,
Hip tiles	4	0	per doz. ,, ,,
Valley tiles	3	8	,, ,, ,,
Best "Hartshill" brand plain tiles, sand faced.	50	0	per 1000 ,, ,,
Do. pressed	47	6	,, ,, ,,
Do. Ornamental do	50	0	,, ,, ,,
Hip tiles	4	0	per doz. ,, ,,
Valley tiles	3	6	,, ,, ,,

WOOD.

BUILDING WOOD.	At per standard. £	s.	d.	£	s.	d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in	13	10	0	15	0	0
Deals: best 3 by 9	13	0	0	14	0	0
Battens: best 2½ in. by 7 in. and 3 in., and 3 in. by 7 in. and 8 in.	11	0	0	12	0	0
Battens: best 2½ by 6 and 3 by 6	0	10	0	less than 7 in. and 8 in.		
Deals: seconds	1	0	0	less thn best.		
Battens: seconds	0	10	0	,,	,,	,,
2 in. by 4 in. and 2 in. by 6 in.	9	0	0	10	0	0
2 in. by 4½ in. and 2 in. by 5 in.	8	10	0	9	10	0
Foreign Sawn Boards—1 in. and 1¼ in. by 7 in.	0	10	0	more than battens.		
¾ in.	1	0	0	,,		
At per load of 50 ft.						
Fir timber: best middling Danzig or Memel (average specification)	4	10	0	5	0	0
Seconds	4	0	0	4	10	0
Small timber (8 in. to 10 in.)	3	12	6	3	15	0
Small timber (6 in. to 8 in.)	3	0	0	3	10	0
Swedish balks	2	10	0	3	0	0
Pitch-pine timber (30 ft. average)	3	5	0	3	15	0
JOINERS' WOOD.	**At per standard.**					
White Sea: first yellow deals, 3 in. by 11 in	24	0	0	25	0	0
3 in. by 9 in.	22	0	0	23	0	0
Battens, 2½ in. and 3 in. by 7 in.	16	10	0	18	0	0
Second yellow deals, 3 in by 11 in.	18	10	0	20	0	0
,, ,, 3 in. by 9 in.	17	10	0	19	0	0
Battens, 2½ in. and 3 in. by 7 in.	13	10	0	14	10	0
Third yellow deals, 3 in. by 11 in. and 9 in.	13	10	0	15	0	0
Battens, 2½ in. and 3 in. by 7 in.	11	0	0	12	0	0
Petersburg: first yellow deals, 3 in. by 11 in.	21	0	0	22	10	0
Do. 3 in. by 9 in.	18	0	0	19	10	0
Battens	13	10	0	15	0	0
Second yellow deals, 3 in. by 11 in.	16	0	0	17	0	0
Do. 3 in. by 9 in.	14	10	0	16	0	0
Battens	11	0	0	12	10	0
Third yellow deals, 3 in. by 11 in.	13	0	0	14	0	0
Do. 3 in. by 9 in.	12	10	0	14	0	0
Battens	10	0	0	11	0	0
White Sea and Petersburg:—First white deals, 3 in. by 11 in.	14	10	0	15	10	0
,, ,, 3 in. by 9 in.	13	10	0	14	10	0
Battens	11	0	0	12	0	0
Second white deals, 3 in. by 11 in.	13	10	0	14	10	0
,, ,, 3 in. by 9 in.	12	10	0	13	10	0
,, ,, battens	10	0	0	11	0	0
Pitch-pine: deals	16	10	0	20	0	0
Under 2 in. thick extra	0	10	0	1	0	0
Yellow Pine—First, regular sizes	44	0	0	upwards.		
Oddments	32	0	0	,,		
Seconds, regular sizes	33	0	0	,,		
Yellow Pine oddments	28	0	0	,,		
Kauri Pine—Planks, per ft. cube	0	3	6	0	5	0
Danzig and Stettin Oak Logs—Large, per ft. cube	0	3	0	0	3	6
Small ,, ,,	0	2	6	0	2	9
Wainscot Oak Logs, per ft. cube	0	5	0	0	5	6
Dry Wainscot Oak, per ft. sup. as inch	0	0	8	0	0	9
¾ in. do. do.	0	0	7	—		
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0	0	9	0	1	0
Selected, Figury, per ft. sup. as inch	0	1	6	0	2	6
Dry Walnut, American, per ft. sup. as inch	0	0	10	0	1	0
Teak, per load	17	0	0	22	0	0
American Whitewood Planks, per ft. cube	0	4	0	0	5	0
Prepared Flooring, etc.—	**Per square.**					
1 in. by 7 in. yellow, planed and shot	0	13	6	0	17	6
1 in. by 7 in. yellow, planed and matched	0	14	0	0	18	0
1¼ in. by 7 in. yellow, planed and matched	0	16	0	1	0	0
1 in. by 7 in. white, planed and shot	0	12	0	0	14	6
1 in. by 7 in. white, planed and matched	0	12	6	0	15	0
1¼ in. by 7 in. white, planed and matched	0	15	0	0	16	6
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0	11	0	0	13	6
1 in. by 7 in. do. do.	0	14	0	0	18	0
¾ in. by 7 in. white do. do.	0	10	0	0	11	6
1 in. by 7 in. do. do. do.	0	12	9	0	15	0
6 in. at 6d. to 9d. per square less than 7 in.						

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £	s.	d.		£	s.	d.
Rolled Steel Joists, ordinary sections	6	0	0	...	6	15	0
Compound Girders, ordinary sections	7	10	0	...	8	10	0
Steel Compound Stancheons	9	2	6	...	10	12	6
Angles, Tees and Channels, ordinary sections	7	10	0	...	8	10	0
Flitch Plates	7	15	0	...	8	5	0
Cast Iron Columns and Stanchions including ordinary patterns	6	12	6	...	7	15	0

METALS.

IRON—	Per ton, in London. £	s.	d.		£	s.	d.
Common Bars	7	0	0	...	7	10	0
Staffordshire Crown Bars, good merchant quality	7	10	0	...	8	0	0
Staffordshire "Marked Bars"	9	10	0	...	—		
Mild Steel Bars	8	5	0	...	8	15	0
Hoop Iron, basis price	8	15	0	...	9	0	0
,, ,, Galvanized	16	10	0	...	—		
(*And upwards, according to size and gauge.)							
Sheet Iron, Black—Ordinary sizes to 20 g.	9	0	0	...	—		
,, ,, 24 g.	10	0	0	...	—		
,, ,, 26 g.	11	15	0	...	—		
Sheet Iron, Galvanised, flat, ordinary quality—Ordinary sizes—6 ft. by 2 ft. to 3 ft. to 20 g.	12	10	0	...	—		
Ordinary sizes to 22 g. and 24 g.	13	0	0	...	—		
,, ,, 26 g.	14	0	0	...	—		

PRICES CURRENT.—*Continued on page 263.*

COMPETITION AND CONTRACTS.

(For some Contracts, etc., still open, but not included in this List, see previous issues.)

COMPETITION.

Nature of Work.	By whom Required.	Premiums.	Designs to be Delivered
*SECONDARY SCHOOL FOR GIRLS	County Borough of Preston	50*l.*, 30*l.*, and 20*l.*	Oct. 16

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by	Tenders to be Delivered
Steam Rolling and Scarifying	Southowram U.D.C.	R. W. Evans, Commercial Bank-chambers, Halifax	Sept. 5
Team Labour	do.	do.	do.
A Shed at the Workhouse	Banbury Guardians	H. Hopkins, Surveyor, Banbury	do.
Hall & Classrooms at English Presby. Ch., Bridgend		P. J. Thomas, Architect, Bridgend	do.
Tools and Stores	Bengal and N.W. Rly. Co.	A. Izat, 237, Gresham House, Old Broad-street, E.C.	do.
Bridgework and Permanent Way Material	South Indian Railway Co.	H. W. Notman, 55, Gracechurch-street, London, E.C.	do.
Cemetery, Penyrheol, near Caerphilly	Caerphilly U.D.C.	A. O Harpur, Surveyor, Council Offices, Caerphilly	do.
31 to 56 Houses at Capcoch, near Aberdare	Capcoch B. Club	A. Davies Secretary, 12, Park View-terrace, Capcoch	do.
Dog Spikes for Rails	Secretary of State for India	Director-General of Stores, India Office, Whitehall, S.W.	do.
Wheels and Axles for Carriages and Wagons	do.	do.	do.
English Presbyterian Church, Maesteg		A. Lloyd Thomas, Engr. and Arch., Church-st.-chbrs., Pontypridd	do.
Public Library, Fratton-road	Portsmouth Corporation	Blake & Cogswell, Architects, Prudential buildings, Portsmouth	do.
140 yds super. Concrete Layer & Wood Block Flooring	Watford Guardians	R. Hurst, Master of Workhouse	do.
Painting and Decorating Town Hall, etc.	Bootle Corporation	Borough Engineer's Office, Town Hall, Bootle	Sept. 6
Painting, etc., to Two Buildings at Workhouse	South Dublin Guardians	J. P. Condon, Clerk, Board Room, James's-street, Dublin	do.
Steam Pump	Stourbridge Guardians	G. F. James, 12, Hagley-street, Stourbridge	do.
Congregational Church, Shaftesbury-av., Roundhay		W. H. Beevers, Architect, 26, Bond-street, Leeds	do.
Painting Isolation Hospital, etc., at Cheslyn Hay	Cannock R.D.C.	H. M. Whitehead, Engineer's Office, Penkridge, Stafford	do.
Making-up Cedar-road Hale	Hale U.D.C.	T. Blagburn, Surveyor, Council Offices, Ashley-rd., Hale, Cheshire	do.
Carting of Road Material	Nantwich R.D.C.	C. E. Speakman, 152, Hospital-street, Nantwich	do.
Posts, etc., for Fencing	East Indian Railway Co.	C. W. Young, Secretary, Nicholas-lane, E.C.	do.
Galvanised Eye-bolts and Strandwire for Fencing	do.	do.	do.
Infectious Hospital near Rose Cottage, Marwood	Barnard Castle R.D.C.	R. Brown, Inspector, Winston	do.
Shop and House, Broughton-in-Furness	Mr. W. Redhead	J. Bell, Architect, Coniston, R.S.O.	do.
Builder's Work to Schools	Denbighshire Education Authority	W. D. Wiles, County Architect, Ruthin	do.
Flagging, Paving, etc., Passages	Birkenhead Corporation	Borough Surveyor, Town Hall, Birkenhead	do.
*NEW QUARTERS FOR NURSES, FEVER HOS.	Ipswich Corporation	Borough Surveyor, Town Hall, Ipswich	do.
2,700 yds. of 10-in. cast-iron pipes, etc., Newbigginghill	Midlothian & Peebles Lunacy Bd.	A. Carter, Engineer, 14, Queen-street Edinburgh	Sept. 7
Paving and flagging streets	Leeds Highway Department	City Engineer's Office, Municipal Buildings, Leeds	do.
Scavenging	Blaydon U.D.C.	R. Biggins, Sanitary Inspector, Blaydon-on-Tyne	do.
Two Cottages at Bodmin	Mr. E. Stanhope	J. Sansom, Architect, Greenbank-lane, Liskeard	do.
Three Dwelling Houses Elland-road, Churwell		T. A. Buttery & S. B. Birds, Architects, Queen-street, Morley	do.
Restoration of Wesleyan Methodist Ch., Mount Hawke		Sampson Hill, Architect, Green-lane, Redruth	do.
Renovation of Wesleyan Chapel, Barnsley	Waterford Tech. Instruction Com.	G. Moxon, Architect, 26, Church-street, Barnsley	Sept. 8
Central Technical School	The Guardians	J. J. Feely, Secretary, Town Hall, Waterford	do.
Boiler House, etc., Hereford		W. W. Robinson, Architect, 10, King-street, Hereford	do.
Two Houses at Chisledon, Wilts	Admiralty	G. Martin, Chisledon	do.
*COASTGUARD BLDGS., NELL'S POINT, BARRY	Glamorgan C.C.	Civil Engineer, H.M. Dockyard, Pembroke Dock	do.
Alterations, etc., at Penarth Police Station	Buchan & Co.	T. M. Franklin, Clerk, Westgate-street, Cardiff	Sept. 9
Alterations, etc., Havod Inn, Clydach	Somerset County Education Com.	T. Roderick, Architect, Ashbrook House, Aberdare	do.
Additions, etc., Lyng Council School	Warminster R.D.C.	Samson & Cottam, Architects, 43 and 45, High-street, Bridgwater	do.
Waterworks, Upton, Scudamore	Mr. E. Falloon	A. F. Long, Engineer, 53, Market-place, Warminster	do.
Two Dwelling Houses, Albion-place, Ulverston	Knaresborough U.D.C.	W. Newby, Architect, 23, Burlington-street, Ulverston	do.
Cattle Market	N.E. Railway Co.	Surveyor's Office, Knaresborough	Sept. 11
Painting on Malton and Thirsk Branch	Wirral R.D.C.	H. J. Rudgard, Engineer, York	do.
Sewers, etc., at Gayton and Willaston	Beaminster R.D.C.	F. E. Priest, Engineer, 13, Harrington-street, Liverpool	do.
Sinking, etc., Borehole	Wallsend, etc., Joint Hospital Bd.	Beesley, Son, & Nichols, Eng., 11, Victoria-st., Westminster, S.W.	do.
Taking Down and Re-erecting Iron Hospitals		F. Davidson, Architect, Central Buildings, Wallsend	do.
Cottage and Business Premises, Bargoed	Manchester Improvement Com.	Mr. Price, London House, Church-street, Bargoed	do.
Painting 266 to 296, Rochdale-road	Alnwick R.D.C.	City Architect, Town Hall, Manchester	do.
Relay. Sewer, Dial-pl. to Tithe Barn-la., Warkworth	Chepping Wycombe Town Council	H. W. Walton, Clerk, Alnwick	do.
*SECOND. SCH. FOR GIRLS, HIGH WYCOMBE	Knottingley U.D.C.	Borough Surveyor, Euston-street, High Wycombe	do.
C.-I Settling Tank (80,000 gallons), Steel Girders, etc.	Crewe Town Council	Garside & Pennington, Engineers, Pontefract	Sept. 12
Street Making	do.	G. Eaton-Shore, Borough Surveyor, Crewe	do.
Street Paving	Secretary of State for India	do.	do.
Carriage Iron Work and Fittings	Leatherhead U.D.C.	Director-General of Stores, India Office, Whitehall, S.W.	do.
Materials	Heston and Isleworth U.D.C.	T. Salkield, Surveyor, Council Offices, Leatherhead	do.
Moveable Timber Floor at Baths, Isleworth	do.	P. G. Parkman, Engineer, Town Hall, Hounslow, W.	do.
Timber and Corrugated Iron Shed at Baths	do.	do.	do.
Making-up Alexandra-road	Horsham U.D.C.	do.	do.
700 tons Hardstone	do.	S. Mitchell, Council Offices, Horsham	do.
1,050 yds. of Broken Pit Flints	Keighley Corporation	do.	do.
Additions to Clough Hse. Mills, Birkby, Huddersfield	Brentford Guardians	Lunn & Kaye, Architects, 14, John William-street, Huddersfield	do.
Paving, etc., Back Rylston-street		W. H. Hopkinson, Borough Engineer, Keighley	do.
*ADDITIONS TO WORKHOUSE AT ISLEWORTH	Halifax Gas Works Committee	Clerk to the Guardians, Union Offices, Isleworth, Middlesex	do.
*ROAD CONSTRUC. OVINGDEAN, NR. BRIGHT'N	Soyland U.D.C.	E. Millard, 1, Finsbury-circus, London, E.C.	do.
Slaters' Work, Roof of Coal Stores	Tynemouth R.D.C.	J. Wilkinson, Gas Works Engineer, Multure Hall-rd., Halifax	Sept. 13
4,000 yds. super. of Concrete and Bitumen Sheeting	do.	R. Horsfall & Son, Engineers, Commercial-street, Halifax	do.
Road Works (6,500 yds. super.), Seaton Delaval		A. S. Dinning, 21, Allison-place, Newcastle-on-Tyne	do.
Road Works (5,500 yds. super.), Forest Hall	Kingston-on-Thames Corporation	do.	do.
Recolouring, etc., Parish Church, Kirkby-in-Furness	Leeds Highway Department	J. Coulton, Sandside Kirkby-in-Furness	do.
*ROADMAKING WORKS	Ipswich Guardians	Borough Surveyor, Clattern House, Kingston-on-Thames	do.
Automatic Flushing Apparatus to Public Urinals	Governors	City Engineer's Office, Municipal Buildings, Leeds	Sept. 14
Dynamo, Motor, etc., Additions, etc., to Switchboard	Lindsey C.C. Education Committee	B. J. Kent, Clerk, 19, Tower-street, Ipswich	do.
Classrooms, Edward VI. Grammar Sch., Chelmsford	Victoria Building Club (No. 2)	C & W. H. Pertwee, Architects, Bank-chambers, Chelmsford	do.
School, Messingham, near Kirton-in-Lindsey	Elham Guardians	Scorer & Gamble, Architects, Bank-street-chambers, Lincoln	do.
Thirty-four Houses, Rowes-square Rhymney	Llandudno U.D.C.	J. Llewellin, Smith, & Davies, Architects, Aberdare	Sept. 15
Asphalt, Playgrounds, Cottage Homes, etc., Cheriton	Selby U.D.C.	R. Lonergan, 11, Cheriton-place, Folkestone	do.
Gloddaeth-street Extension	Kent County Lunatic Asy. Visitors	E. P. Stephenson, Engineer Town Hall, Llandudno	do.
*ENGINE AND BOILER HOUSE, COAL STORE	do.	P. Griffith, Engineer, 54, Parliament-street, S.W.	do.
*REPAIRS, ETC., TO CHARTHAM ASYLUM	Elham Guardians	W. J. Jennings, Architect, 4, St. Margaret's-street, Canterbury	do.
*ALTER. HEAD ATTEND OFF. CHARTHAM ASY.	Committee of Management	do.	do.
*ASPHALT. PLAYGR., CHERITON COT. HOMES	Pembrokeshire Educa. Authority	D. Conroy, Architect, 21, Shipquay-street, Londonderry	Sept. 16
Catholic Temperance Hall, Limavady, Ireland	Harrow U.D.C.	D. E. Thomas, Architect, 17, Victoria-place, Haverfordwest	do.
Alters., etc., Council Schl., St. Dogmael's, nr. Cardigan	Stretford U.D.C.	J. P. Bennett's Surveyor, Harrow	do.
2,000 tons of Granite	Stockport Guardians	E. Worrall, Surveyor, Council Offices, Old Trafford	Sept. 18
Main Roads Paving (30,000 yards Granite Setts)		C. F. Johnson, Clerk, Union Offices, Stockport	do.
Union Offices, Shaw Heath	Worthing Education Committee	J. Wittet, Architect, Elgin	do.
Additions, etc., to Public School Buildings, Rothes		Education Offices, Worthing	do.
*ERECTION OF INFANTS' SCHOOL			

CONTRACTS.—*Continued.*

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by	Tenders to be Delivered
Conversion of Dixon Sch. into Pupil Teachers' Centre	Birmingham Education Committee	Finance Office, Educa. Department, Edmund-street, Birmingham	Sept. 19
Water Supply Works, Upper Colwyn Bay	Colwyn Bay and Colwyn U.D.C.	W. Jones, Water Engineer, Council Offices, Colwyn Bay	do.
*ALTERA. TO SHEFFIELD COUNTY COURT	H.M. Office of Works	H.M. Office of Works, Storey's-gate, Westminster, S.W.	do.
Diversion of the Marfleet Drain	N. E. & Hull & Barnsley Ry. Com.	T. M. Newell & R. Pawley, Engineers, Dock Office, Hull	Sept. 20
Electricity Plant	Pembroke U.D.C.	R. Hammond & Son, Engineers, 64, Victoria-street, Westminster	Sept. 22
School, Gilmore-place	Edinburgh School Board	Mr. Carfrae, Architect, 3, Queen-street, Edinburgh	Sept. 23
Pixham-lane Drainage	Dorking U.D.C.	G. R. Strachan, Engineer, 9, Victoria-street, S.W.	do.
*REPAIRS TO INFIRMARY, PEMBROKE	Pembrokeshire, etc., Infirmary	T. H. Jones, Secretary, High-street, Haverfordwest	do.
Bamford Filters	Derwent Valley Water Board	E. Sandeman, Engineer, Bamford, near Sheffield	Sept. 25
Ashopton to Grindleford Section of Derwent Aqueduct	do.	W. J. Board, Town Hall, Rotherham	do.
Furnishing New Infectious Hospital	Rotherham Corporation	District Engineer, Brookmill-road, Deptford, S.E.	Sept. 26
Steam Engine and Pumps, Hill Park, Westerham	Metropolitan Water Board	Council's Surveyor, Wanstead, N.E.	Oct. 2
*MAKING-UP ORFORD-ROAD	Wanstead U.D.C.	Superintending Architect's Department, 15, Pall Mall East, S.W.	Oct. 4
*REP. DECORA., TO MANSION, TWICKENHAM	London C.C.	Freeman, Son, & Gaskell, Architects, 11, Carr-lane, Hull	Oct. 10
Offices, Chapman-street, Hull	Shaw & Gaskell	Cowell & Shaw, Surveyors, 49, Finsbury-pavement, E.C.	No date.
*MAK-UP PARK RD., HARROW-ON-THE-HILL	Trustee late D. Brown, Esq.	Architect, 1, Richmond-road, Exeter	do.
*ERECTION OF SCHOOL AND MASTER'S HOUSE	Devon Education Committee	W. J. Jennings, Architect, 4, St. Margaret's-street, Canterbury	do.
*ADDIS., SIMON LANGTON SCHS., CANTERBURY			do.

Those marked with an asterisk (*) are advertised in this number. *Competitions*, iv. *Contracts*, iv. vi. viii. x. *Public Appointments*, —.

PRICES CURRENT—*Continued from page 261.*

METALS (*continued*).

IRON—*continued.* Per ton, in London.

	£	s.	d.		£	s.	d.
Sheet Iron, Galvanised, flat, best quality—							
Ordinary sizes to 20 g.	15	10	0	...			
" " 22 g. and 24 g.	16	0	0	...		—	
" " 26 g.	17	10	0	...		—	
Galvanised Corrugated Sheets—							
Ordinary sizes 6 ft. to 8 ft. 20 g.	12	10	0	...		—	
" " 22 g. and 24 g.	13	0	0	...		—	
" " 26 g.	13	15	0	...		—	
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	11	0	0	...		—	
Best Soft Steel Sheets, 22 g. & 24 g.	12	0	0	...		—	
" " 26 g.	13	10	0	...		—	
Cut nails, 3 in. to 6 in.	9	0	0	...	9	10	0
(Under 3 in., usual trade extras.)							

LEAD, &c. Per ton, in London.

	£	s.	d.		£	s.	d.
LEAD—Sheet, English, 3lb. and up	16	17	6	...		—	
Pipe in coils	17	7	6	...		—	
Soil pipe	19	17	6	...		—	
Compo pipe	19	17	6	...		—	
ZINC—Sheet—							
Vieille Montagne ....ton	29	15	0	...		—	
Silesian	29	10	0	...		—	
COPPER—							
Strong Sheet....per lb.	0	0	11	...		—	
Thin " .... "	0	1	0	...		—	
Copper nails .... "	0	0	11	...		—	
BRASS—							
Strong Sheet.... "	0	0	10	...		—	
Thin " .... "	0	0	11	...		—	
TIN—English Ingots .... "	0	1	6	...		—	
SOLDER—Plumbers' .... "	0	0	7	...		—	
Tinmen's.... "	0	0	9½	...		—	
Blowpipe.... "	0	0	1½	...		—	

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft. delivered.
" fourths	1½d. " "
21 oz. thirds	3½d. " "
" fourths	2½d. " "
26 oz. thirds	4½d. " "
" fourths	3½d. " "
32 oz. thirds	5½d. " "
" fourths	4½d. " "
Fluted Sheet, 15 oz.	3d. " "
" 21 oz.	4d. " "
½ Hartley's Rolled Plate	2d. " "
⅝ " " " "	2½d. " "
¾ " " " "	2½d. " "

OILS, &c.

		£	s.	d.
Raw Linseed Oil in pipes	per gallon	0	1	7½
" " " in barrels	"	0	1	8
" " " in drums	"	0	1	10
Boiled " " in pipes	"	0	1	9½
" " " in barrels	"	0	1	10
" " " in drums	"	0	2	0
Turpentine, in barrels	"	0	3	10
" in drums	"	0	4	0
Genuine Ground English White Lead	per ton	19	15	0
Red Lead, Dry	"	19	5	0
Best Linseed Oil Putty	per cwt.	0	6	6
Stockholm Tar	per barrel	1	19	0

VARNISHES, &c. Per gallon.

	£	s.	d.
Fine Pale Oak Varnish	0	8	0
Pale Copal Oak	0	10	6
Superfine Pale Elastic Oak	0	12	6
Fine Extra Hard Church Oak	0	10	0
Superfine Hard-drying Oak, for seats of Churches	0	14	0
Fine Elastic Carriage	0	12	6
Superfine Pale Elastic Carriage	0	16	0
Fine Pale Maple	0	16	0
Finest Pale Durable Copal	0	18	0
Extra Pale French Oil	1	1	0
Reynhell Flatting Varnish	0	18	0
White Copal Enamel	1	4	0
Extra Pale Paper	0	12	0
Best Japan Gold Size	0	10	6
Best Black Japan	0	16	0
Oak and Mahogany Stain	0	9	0
Brunswick Black	0	8	6
Berlin Black	0	16	0
Knotting	0	10	0
French and Brush Polish	0	10	0

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

*** Denotes *accepted.* † Denotes *provisionally accepted.***

ANNFIELD PLAIN.—For erection of general manager's house, for the Annfield Plain Industrial Co-operative Society. Mr. G. T. Wilson, architect, 22, Durham-road, Blackhill:—

W. Johnson, Temtobie £580

APPLEBY (Lincolnshire).—For a concrete and steel service reservoir, for the Urban District Council, Brumby and Frodingham. Mr. A. Atkinson, C.E., Brigg:—

J. Howe & Co.	£1,090 10	J. W. & G. Sugden	£921 10
H. Ashley	936 0	H. J. Thompson	872 7
R. C. Brebner & Co., Edinburgh*	932 0	E. Tabor	862 15

BARNTON.—For sewerage and sewage disposal works, for Northwich Rural District Council. Mr. W. M. Beckett, engineer, 33, Brazennose-street, Manchester:—

S. Huston, Stamford-road, Bowdon* .. £2,425 4 2

BARROW-ON-SOAR.—For enlargement of the Grammar School, etc., for the Leicestershire County Council Education Committee. Messrs. Barrowcliff & Allcock, architects, Town Hall-chambers, Loughborough:—

A. & W. Chambers	£755 7 2	C. A. Dobson	£672 0 0
Scurr, Jowett, & Co.	707 6 0	J. T. Ball	669 15 0
W. Hanson	700 0 0	W. H. Fewkes	647 10 0
Leicester Builders	700 0 0	W. Corah & Son	639 0 0
C. Wright	694 4 0	W. F. Harding	638 0 0
T. Herbert	678 0 0	A. Faulks	635 0 0
H. Hammond	673 0 0	T. Barker & Son	634 19 0
		A. J. Wileman, Loughborough*	603 0 0

CWMBACH.—For erecting twenty dwelling-houses in Sirfounder-road, Cwmbach, for the Cwmbach Building Club. Messrs. Morgan & Elford, architects, 42, Canon-street, Aberdare:—

Per House.

Jones Bros.	£287 10 0
Price Bros.	244 10 0
D. S. Davies, Ardwyn, Trecynon, Aberdare*	229 0 0

DEVIZES.—For erecting Devizes Secondary School. Mr. R. E. Brinkworth, architect, 16, Old Bond-street, Bath:—

W. Webb	£7,462 0 0	F. J. Blackmore	£6,450 14 6
Downing & Rudman	7,277 0 0	W. R. Olivers	6,280 10 0
Spackman & Sons	6,694 0 0	H. Ash	6,263 0 0
Hayward & Wooster	6,597 0 0	A. W. Long	6,111 0 0
Wills & Sons	6,490 0 0	A. J. Colborne	6,073 4 0
Chancellor & Sons	6,480 0 0	J. Long & Sons, Bath*	5,982 0 0

DUFFRYN RHONDDA.—For erecting seventy-eight houses, including two business premises, at Duffryn Rhondda, Cymmer, P.T., for the Nantybar Building Society. Messrs. W. P. Jones & Peregrine, architects and surveyors, Bank-chambers, Port Talbot:—

D. Ewards	£20,065 10 0	J. Nicholas, Saw Mills & Joinery Works, Port Talbot*	£13,190 13 0
J. Davey	19,619 1 6		
J. Davies	19,470 0 0		
B. Cockwell	16,535 0 0		
M. Cox	15,294 0 0		
M. Jenkins	14,426 10 0		

EMYVALE.—For new dispensary residence, Emyvale, co. Monaghan, for the Guardians of Monaghan Union. Mr. W. A. Scott, architect, 74, Hollybank-road, Drumcondra:—

	Brickwork.	Masonry.
M'Kay & M'Nally	£1,350	£1,325 0 0
J. Callan	1,150	1,220 0 0
H. M'Cann	1,080	1,040 0 0
F. Duffy	1,075	1,035 0 0
H. M'Geough, Monaghan*	939	924 18 9

ENDERBY.—For erecting Council school, for the Leicestershire County Council. Messrs. Barrowcliff & Allcock, architects, Mill-street, Loughborough:—

Jeffs & Edwards	£3,990 0	Langton & Son	£3,277 14
Leicester Builders, Ltd.	3,433 0	E. Orton	3,224 0
W. F. Harding	3,370 0	J. H. Clayton	3,220 0
R. Peach	3,286 10	W. Moss	3,195 0
Haskard, Rudkin, & Beck.	3,275 0	T. Barker & Son	3,158 19
A. J. Wileman	3,270 0	C. Wright	3,149 0
T. Herbert	3,264 0	W. Moss & Sons, Ltd.	3,070 0
C. A. Dobson	3,250 0	W. Corah & Son, Loughborough*	2,992 0
G. A. Phipps	3,235 0		

FARNHAM COMMON (Bucks).—For the erection of residence for Dr. H. Sydney. Mr. F. C. Moscrop-Young, architect, 2, Lancaster-place, W.C. Quantities by Messrs. J. Waldram & Son, 12, Buckingham-street, W.C.:—

		Conservatory.
J. Wheeler	£2,650	£72 11 0
J. H. R. Atkins	2,244	67 10 0
W. Creed	2,043	62 10 0
H. D. Bowyer	1,900	59 0 0
F. W. Harris & Co.†	1,882	59 0 0

GODALMING.—For erecting business premises, Bridge-street, for Godalming and District Co-operative Society. Mr. H. Moon, architect, 96, High-street, Godalming. Quantities by architect:—

Mitchell Bros.	£2,250 0 0	Drowley & Co.	£1,902 6 0
J. W. Humphrey	2,085 0 0	F. Milton	1,899 0 0
R. Smith	2,036 0 0	Wallis & Bennett	1,787 7 3
Haslemere Builders, Ltd.	1,990 0 0	F. Raynsford	1,750 0 0
Deacon & Son	1,921 0 0	D. Fry, Godalming*	1,703 9 0
J. Lee	1,947 0 0		

GROBY.—For erecting a Council school for the Leicestershire County Council Education Committee. Messrs. Barrowcliff & Allcock, architects, Mill-street, Loughborough:—

W. F. Harding	£1,800 0	B. Shipman	£1,663 8
C. A. Dobson	1,767 0	C. Wright	1,651 0
J. C. Kellett & Son	1,725 0	J. T. Ball	1,650 0
R. Peach	1,721 0	G. Toone & Sons	1,648 0
A. J. Wileman	1,720 0	J. H. Clayton	1,635 0
Jeff & Edwards	1,720 0	T. Barker & Son	1,624 19
Leicester Builders, Ltd.	1,690 0	T. Herbert	1,556 0
Haskard, Rudkin, & Beck.	1,665 0	F. Sleath	1,549 0
		W. Corah & Son, Loughborough*	1,519 0

GUILDFORD.—For the rebuilding of Nos. 189 and 190, High-street, for Mr. W. J. Lympass. Messrs. Clemence & Moon, architects, Guildford. Quantities by architects:—

F. Milton	£3,260	H. Brand	£3,123
Tribe & Robinson	3,225	A. Johnson, Guildford*	3,093
Drowley & Co.	3,195		

GUILDFORD.—For erection and completion of a house in London-road, for Mr. L. C. Biddle. Messrs. Clemence & Moon, architects, Guildford. Quantities by architects:—

Swayne & Son	£1,347	Tribe & Robinson	£1,315
A. Johnson	1,331	E. & J. H. Holden, Cranleigh*	1,298
S. Ellis	1,322		

HASLEMERE (Surrey).—For the erection of a house, for Mr. M. Dawson, on Beech-road. Mr. J. H. Howard, Architect and Surveyor, Haslemere:—

J. Eele	£1,341 0	Haslemere Builders Ltd.	£1,162 0
D. Fry	1,250 0	R. Smith, Haslemere†	1,105 15
Chapman & Lowry	1,237 19		
W. Rollason	1,220 0		

HASLEMERE (Surrey).—For the construction of a new road at Camels Dale, for the Sussex County Council. Mr. J. H. Howard, Architect and Surveyor, Haslemere:—

Chapman & Lowry	£145 10	G. A. Franks, Guildford*	£262 0
Haslemere Builders, Ltd.	347 0		

LONDON.—For additions and alterations to Shoreditch County Court :—

		Allowance for old materials.
J. Shelbourne & Co.	£1,500 0 0	—
Cons & Smith	1,399 0 0	£7 11 6
J. Mowlem & Co., Ltd. ..	1,394 0 0	—
G. R. McKenzie & Co., Ltd.	1,336 11 0	4 10 0
Newell & Lusty	1,234 18 0	7 3 0
Martin, Wells, & Co., Ltd.	1,184 0 0	—
H. L. Holloway	1,160 0 0	8 0 0
C. Dearing & Son	1,149 0 0	5 0 0
Staines & Son	1,130 0 0	10 0 0
W. Mills	1,059 0 0	5 0 0
R. E. Nightingale	1,054 0 0	21 0 0
F. & G. Foster Clifford-road, Norwood Junction*	968 0 0	—

LONDON.—For taking down and rebuilding factory, Sumner-road, Peckham, S.E., for Mr. Henry Pennack. Mr. A. Garnar, architect, 66, Oakhurst-grove, East Dulwich, S.E. :—

Laurence & Co., Peckham* £375

LONDON.—For alterations and additions, St. Ann's Schools, Avenue-road, Tottenham. Messrs. Warran & Stupart, architects, Harringay, N. :—

	Drainage and Offices.	Extension of Classroom.
H. Runham-Brown	£238 0 0	£243 0 0
J. Stewart	216 0 0	312 0 0
C. Hale & Co., Harringay	207 0 0	*239 14 0
J. Groves & Son	198 10 0	264 0 0
A. Baker, Tottenham	*147 0 0	359 10 0

LONDON.—For the erection of a new police section house at Islington. Mr. J. Dixon Butler, Architect and Surveyor to the Metropolitan Police, New Scotland Yard. Quantities by Messrs. Thurgood, Son, & Chidgey, Charing Cross-chambers, Duke-street, Adelphi :—

Harris & Wardrop	£5,570	Prestige & Co.	£5,270
C. Ansell	5,507	Grover & Son	5,268
Lathey Bros.	5,500	Ashby & Horner ..	5,239
F. & H. F. Higgs ..	5,484	Holloway Bros. ..	5,218
Lascelles & Co.....	5,462	Dearing & Son ..	5,191
Kilby & Gayford ..	5,416	Lawrance & Sons..	4,984
Mowlem & Co.....	5,345	Leslie & Co.	4,844

LONDON.—For further alterations at 88, High-street, Peckham, S.E., for Mr. Henry Morse. Mr. Arthur Garnar, architect, 66, Oakhurst-grove, East Dulwich, S.E. :—

W. Smith* £110 0 0

MARCH (Cambs.).—For erecting farm buildings on land in Binnimoor. Mr. J. Collingwood, architect and surveyor :—

Parker.....	£190 0 0	Swann.....	£148 4 0
Shanks	175 0 0	Whittlesey	148 0 0
Duck	160 0 0	Papworth	148 0 0
Whve	154 10 6	Heath	143 6 0
Redhead	148 5 0	Eggitt, March* .	132 0 0

NEWTOWN LINFORD.—For erecting a Council school, for the Leicestershire County Council Education Committee. Messrs. Barrowcliff & Allcock, Architects, Mill-street, Loughborough :—

Leicester Builders, Ltd.	£1,260 0 0	A. J. Wileman	£1,100 0 0
J. C. Kellett & Son.....	1,225 0 0	T. Herbert ..	1,097 0 0
R. Peach	1,215 0 0	T. Barker & Son	1,079 19 0
Jeffs & Edwards	1,215 0 0	W. Smith ..	1,079 15 0
Haskard, Rudkin, & Beck.	1,186 0 0	C. Wright ..	1,079 9 0
J. H. Clayton	1,184 0 0	F. Sleath....	1,067 0 0
H. Hammond	1,150 0 0	W. Corah & Son.....	1,043 18 0
W. F. Harding	1,140 0 0	C. A. Dobson.	1,003 10 0
J. T. Ball....	1,130 0 0	W. Wesley. Woodhouse Eaves*	999 0 0
G. Toone & Sons	1,117 0 0		
B. Shipman..	1,113 16 6		

NUNEATON.—For rebuilding the chancel of St. Mary's Abbey Church, for the Restoration Committee. Mr. Harold Brakspear, F.S.A., architect, High-street, Corsham, Wilts. Quantities by Mr. E. C. Pinks, Parliament-mansions, Victoria-street, S.W. :—

Dallow & Sons	£5,950	G. F. Smith & Sons	£3,900
Hayward & Wooster	4,689	T. Smith	3,740
J. Hatherley.....	4,473	Collins & Godfrey..	3,682
King & Ridley	4,197	H. Smith	3,589
Gowing & Ingram	4,138	Willcock & Co., Wolverhampton†	3,395
Bowman & Sons ..	3,910		

PONTSHONORTON.—For erecting a boys' school to accommodate 250 pupils, for the Education Committee. Mr. P. R. A. Willoughby, Surveyor, Education Offices, Pontypridd :—

E. R. Evans Bros., Cardiff £3,598 12 4

QUORN.—For enlargement of the Grammar School, for Leicestershire County Council Education Committee. Messrs. Barrowcliff & Allcock, architects, Town Hall-chambers, Loughborough :—

A. & W. Chambers	£789 8 0	R. Peach	£662 11 0
C. Wright	776 0 0	T. Herbert	612 0 0
W. Hanson....	695 0 0	W. F. Harding	661 10 0
J. T. Ball	689 5 6	W. Corah & Son	659 0 0
A. Faulks	688 0 0	T. Barker & Son	649 19 0
H. Hammond	669 0 0	C. A. Dobson	647 11 6
Leicester Builders.....	669 0 0	W. H. Fewkes	647 10 0
		A. J. Wileman	609 0 0

RATBY.—For enlarging the Ratby Council School, together with out-offices, drainage, etc., for the Leicestershire County Council Education Committee. Messrs. Harding & Topott, architects, Hotel-street, Leicester :—

A. & W. Chambers	£1,964 13	Leicester Builders, Ltd. ..	£1,779 0
G. Toone & Sons	1,944 0	W. Moss	1,765 0
C. W. Maclock	1,913 0	E. Bax.....	1,765 0
J. Marston & Son	1,893 0	F. Sleath	1,759 0
W. Smith.....	1,841 3	J. Cole	1,728 0
		B. Shipman, Ratby*	1,699 4

SOUTH TWERTON (Bath).—For the erection and entire completion of five additional classrooms, being an extension of the three departments of the South Twerton Council School, for the Somerset County Education Committee. Mr. W. F. Bird, Architect, Midsomer-Norton, Somerset. Quantities by Architect :—

Hayward & Wooster	£1,943 0	E. Chancellor & Sons	£1,750 0
E. Love	1,925 0	J. Long & Sons	1,727 0
Erwood & Morris	1,893 0	A. J. Colborne .	1,687 2
A. E. Denby & Co.	1,799 0	F. Amery	1,628 0
A. Willis & Sons	1,784 0	W. J. Blackmore	1,579 0
		W. Webb, Bath*	1,519 0

WELTON, MIDSOMER-NORTON (Somerset).—For the erection and entire completion of three additional classrooms, with teachers' retiring-room, and enlargement of offices, being an extension of the Welton Council Schools, for the Somerset County Education Committee. Mr. William F. Bird, Architect, Midsomer-Norton. Quantities by Architect :—

W. R. Moody	£1,916 8 8	W. Webb....	£1,645 9 0
J. Child & Son	1,862 0 0	Erwood & Morris	1,633 0 0
Hayward & Wooster ..	1,847 0 0	W. A. Catley	1,632 0 0
E. Love	1,790 0 0	A. Willis & Sons	1,546 0 0
A. E. Denby & Co.	1,700 0 0	F. J. Amery, Grove-st.,	
A. J. Colborne	1,649 10 0	Bath*	1,520 0 0
W. Tovey ..	1,649 0 0		

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